ARCHIVE ETHER:
METADATA MAPPING AND THE PRESERVATION OF NEW MEDIA ART

by
AURELIA MOSER

A thesis
Submitted in partial fulfillment
Of the requirements for
The degree of Master of Science
Theory, Criticism and History of Art, Design and Architecture
Library and Information Science
School of Art and Design
Pratt Institute

May 2013

ARCHIVE ETHER:
METADATA MAPPING AND THE PRESERVATION OF NEW MEDIA ART

by

Aurelia Moser

Received and approved:

Thesis Advisor – Jack Toolin

5-11-13

Date

Department Chair

Date

ACKNOWLEDGEMENTS

I would like to especially thank the History of Art and Library and Information Science departments at Pratt for fostering this thesis topic over my tenure as a masters' student. Likewise, I would like to thank my advisor, Jack Toolin, for inspiring me to take on the topic and pursue a New Media art concentration, my proofreader and very best friend Grace Maalouf and my interview subject for the last section, Richard Rinehart, for graciously giving me their time and energy as I was developing my thoughts and (poorly) articulating themes in copious drafts.

.: TABLE OF CONTENTS :.

.: ARCHIVE ETHER – AN INTRODUCTION :.

"While cyberspace per se is an exclusive realm, its production depends on the material space beyond its interfaces. Cyberspace is real estate in terms of data space on computer disks and in mainframes, personal space in seats in front of computer workstations, frequencies on the broadcast spectrum, satellite space off which to bounce signals, and room in the bandwidth of fiberoptic cables that global corporations struggle among themselves to own and control."

- Margaret Morse, *Virtualities: Television, Media Art and Cyberculture*, 1998

Regardless of where you position 'the now' in new media, be it pre- post- or present- modern condition, concerns about the persistence and permanence of New Media art are actively appreciating. If, as Marshal McLuhan intoned, "the medium is the message,"[1] then the complications of preserving a rapidly multiplying set of media types is continuously eroding the output of new media artists. Though previous art eras shared a fixed mortality, the preservation of new media works lacks a codified and universal system of care for posterity. Paintings and object conservation labs exist in most museums, while the preservation of born-digital or new media art has yet to secure that same universal attention, and thus is more vulnerable than its predecessors in more traditional media. As projects atrophy in old technology, the wake of new media art rapidly diffuses, leaving a gap in our collective art history. And so the issues of where such ephemeral and variable media art might fit in our modern museums and our cultural memories remain to be determined. These issues are immediate, and few standards have been established for conservation. Thus, the diversity of media continues to grow at an alarming rate, the problems with preservation of these media continue to aggravate, and this thesis acknowledges these issues, while also suggesting that the culture of conservation, and curation must likewise accept an overhaul of traditional practice moving forward.

Amid this profusion of seemingly chaotic content, the Diderotian *Encyclopédie* finds new expression in the graph and the social network, and the associated concerns with classification and articulation in a union catalog or singular repository that compiles and classifies all knowledge persist. So much of new media classification and conservation can be traced back to an impulse or organize "all the things"[2] under a cohesive system of standardized protocols, and part of the challenge in New Media preservation is to map those diverse artworks to a specific encoding schema or categorization system, to chart, define and refactor them as they hasten towards obsolescence. The expiration date of these works is imminent; in their employment of

[1] Marshall McLuhan, "The medium is the message" from *Understanding media: The extensions of man* (New York: McGraw Hill, 1964), 9-12.

[2] "all the things" references a popular internet meme and quotation borrowed from the colloquial discourse of the webcomic *Hyperbole and a Half* (June 2011) incorporated subsequently into the common parlance of code artists on github (a social coding site); in this case, it both alludes to that colloquialism and cites the adoption of colloquialisms and open source practice as the next phase in art conservation (for new media and post-media, as the case may be).

multiple technologies, interactivities and collaborative initiatives, they present challenges to preservation that continue to multiply.

Commenting on the absence of new media archives in a short review for *Leonardo* (Journal of the International Society for the Arts, Sciences and Technology), Lev Manovich writes about how digital art lacks the theoretical legacy of other art forms.[3] In redefining traditional approaches to art preservation to suit new media, the exclusionary quality of the "art world" legacy dissolves; within this new space of new challenges, we also find hope in the novelty of new technologies, new implementations of metadata schema or networked intelligence which allow us to better map and predict the uncharted aspects of new media preservation. Thus, the climate of conservation, which has so long been the domain of museums and institutions, shifts progressively to a more progressive population of open source volunteers and indie hackers. Traditional methodologies for preservation no longer apply to new media, and with the help of a technologically enabled world community we can define new paradigms for art-making and maintenance. New media art demands a new approach, giving archivists and conservators the bandwidth for creative solutions in preservation, if also, the comparative insecurity that accompanies an absence of standards.

To this end, an approach to conservation cartography, or mapping the ephemeral "virtual" environment in a recognizable and navigable topography becomes essential. Maps become the metaphor for how we will approach an uncharted territory of new media preservation, manifest destiny in conservation. In many ways the analog *encyclopédies* of history provide that same taxonomic mapping of our cultural climate, codified in text form. Even in programming and cataloging departments of museums and libraries, maps share rhetoric with metadata management;[4] there is a comparable attraction to structured trees, hierarchies and diagrams in terms of organizing information. As humans, we harbor a natural affinity for anchoring the overwhelming content of our cyber-scape in a familiar terrestrial context, so structures and software that geo-tag our content and embed it in a map providing conceptualizations of our analog environment are incredibly valuable.[5] Even Graham and Cook allude to this impulse in

[3] Lev Manovich, "Ten Key Texts on Digital Art: 1970-2000," *Leonardo* 35:5 (2002): 567.

[4] Metadata "crosswalks" can connect two metadata (defined as "data about data") schema by mapping similar fields; in this way, catalogues can incorporate multiple media types by mapping fields that are similar but may have different entry formats (i.e. a music piece can be included in a collection of sheet music where the "composer" and "performer" fields in each are mapped to the corresponding equivalent of "author" in text. Search efficiency in a collection database or archive is augmented when these mappings connect multimedia nodes in a collection.

[5] Without delving too deeply into Guy Debord's psychogeography (1955) as a subject ancillary to this topic, it is important to note that Drew Hemment (2004) references this idea in his discussion of "The Locative Dystopia," or the environment of heavy surveillance and locative capacity used as augmentation to leisure and consumer lifestyle with the development of new "locative media." These media are the "portable, networked, location aware computing devices for user-led *mapping* and artistic interventions in which the geographical space becomes its canvas," and as such they

their *Rethinking Curating: Art after New Media* (2011) text: "Net-based artworks use not only the connection in the network of computers—the protocols of communication between computers—but also the browser window. Both connection and window are site specific."[6] Site-specific and geo-referencing have adapted to the rhetoric of describing even our virtual art topographies. Within such networks we again graduate to the organization principles of Diderot's *Encyclopédie*, wherein "Wikipedia maps knowledge as ambitiously as the encyclopedia of old; only its cartography is different, its medium is different but the message is the same."[7] Indeed, mapping is woven in the very structure and method of Wikipedia itself; it is not found in orderings and topics, but in the network-locative eruptions of facticity and assertion, citation and correction that make up the entries. As Battles further asserts in his article on wikipedic mappings, "knowledge is a property of the network," and so too new knowledge about new media populates from the user-generated content and crowd-sourced environments of gaming and social media. Increasingly, curation and conservation moves away from the exclusivity of the gallery and into the public forum populated by the hoi polloi of artists, gamers, bloggers, and their digital discontents.

Thus, art conservation and preservation enters a more pedestrian arena, less focused in an exclusive art milieu; and despite its popular associations, this arena merits consideration and critique. Allowing the blogger or the gamer to immerse himself in the art world and work to fix what is broken fuses and agile 'maker' mentality with the challenges of our technologically enabled world. So, in new media, there exists a kind of vitality and engagement potential across networked masses perhaps unprecedented in previous artistic periods. In this respect, technology as a characteristic of new media creates unique conditions for an archivist. Strangely, in *Homo Faber* (1957), Max Frisch (1911-1991) defines technology as "the knack of so arranging the world that we don't have to experience it."[8] Yet, in mapping out the persistence of new media art, we are enabling continued experience of our *www.orld*, and our efforts now will iterate in the foreseeable forever as art progressively imitates life, and approaches closely our new media identities and personal topographies. New conservation efforts embrace a *media*ted[9] platform for

---

enable new artworks that blur the boundary between artist and viewer. In terms of conservation, this complicates authorship and attribution, as well as the replicability of artworks defined by particular digital reports of physical environment. Drew Hemment, "The Locative Dystopia," *OCLC* (Jan 7, 2004).

[6] Beryl Graham and Sarah Cook, *Rethinking Curating: Art After New Media* (Cambridge, Mass.:MIT Press, 2010), 66.

[7] Matthew Battles, "Knowledge is a property of the network: Mapping Britannica's world in a Wikipedia age," *Nieman Journalism Lab* (March 20, 2012) accessed March 23, 2012, http://www.niemanlab.org/2012/03/knowledge-is-a-property-of-the-network-mapping-britannicas-world-in-a-wikipedia-age/.

[8] Max Frisch, "Second Stop," from *Homo Faber: ein Bericht*. Frankfurt: Suhrkamp, 1957.

[9] In his catalogue for *Collect the WWWorld*, Domenico Quaranta makes a case for mediated forms of experience: captures and surrogates that compress our experience into an easily archivable asset) he stresses further the ubiquity of these surrogates now "perceived as authentic experience" in explaining a shifting approach to preservation through

new media art preservation, where archivists must juggle combinations of migration, emulation, preservation, and replication techniques to maintain easily atrophied media types. This essay therefore provides a practical guide to the primary preservation issues that face our "post-medium"[10] art climate. What follows critically assesses conservation efforts across the geographic and thematic boundaries that can inefficiently subdivide concurrent conservation studies rather than fostering unified efforts. Under the umbrella of metadata mapping for mediated preservation, two main programs of preservation emerge: the exhaustive archive protocols initiated by cultural institutions and the DIY digital library culled from communities of social media and maker models. This paper will explore the potential of each in the context of the internet art, interactive installations, and networks of bio generative and UGC (user-generated content) art projects.

Ultimately, a clearer understanding of "post-medium" preservation, must necessarily merge the institutional efforts in archival preservation with the social media model of Wikipedia and user-generation. Though the open source and net.art community has celebrated its embrace of 'art for all' and attempted a distance from the exclusive 'art world' scene, preservation initiatives remain stuck in an art-world archival ether.[11] Curators still cling to traditional approaches to conservation, championing the medium and equating the technical accouterments of a piece with its essence. To combat this, or improve upon it, we should embrace and inscribe preservation in a crowd-sourced and community-driven system. Our most universal and adaptable maps for managing a growing mass of new media will come from an embrace of current networked technologies, cloud infrastructure, and creative workflows à la Amazon's Mechanical Turk. Rather than reject a fusion of contemporary media with media art, we should embrace both. Many of the most progressive archivists in new media sprout from the gamer and blogger communities and skirt the museum and gallery scene entirely. This promises to change little as we progress comfortably into an increasingly technological culture, one that already build semantic understanding into our Google graph searches, predicts our relationship predilections in social media and our preferences on Amazon.com. We increasingly map our physical selves to a networked cyber-scape, and efforts to capture our culture should leverage the networked intelligence of our most advanced systems, or risk being swallowed into archival ether.

---

copy. See Domenico Quaranta, *Collect the WWWorld: The Artist as archivist in the Internet Age* (Brescia: LINK Editions, 2011), 10.

[10] 'Postmedia' in this case references Domenico Quaranta's term for art after 'new media,' defined in the fourth chapter of *Media, New Media, Post Media* (2011). The definition stems from the concept that in net art and post-digital art, the medium is de-emphasized, and the content or message of the work becomes the object of preservation.

[11] 'Archival Ether' in this case refers to the nebulous and forgotten state of new media conservation, ill-defined and without authoritative critical conservation standards. It also foreshadows reference to Derrida's *Archive Fever* and ultimately, all discussion of archival systems as precedent for New Media preservation programs.

As such, this paper will initially resituate ‘new media’ in a ‘post media’ state, where the content and not the medium is the new focus of preserving an artistic message. It will then address some of the challenges to preservation relative to two primary case studies, considering net.art, and interactive sound art installations. Finally, it will propose progressive programs for preservation consistent with current and potential practice.

.: CHAPTER I :.
MAPPING THE ARCHIVE: PREERVING PROJECTS IN POST_MEDIUM ART

In a brief article for *Art Book* (2005), Charlie Gere relates a condition common to New Media Art studies: a lack of critical scholarship. Paraphrasing Steve Dietz's contemporary concern that New Media lacks significant study, he writes that "if new media art wishes to be taken seriously then it is necessary to start to develop appropriately robust and convincing means by which it can be examined critically."[12] With that objective in mind, this initial section seeks to define New Media as a post-medium art, describe how it maps into collections, and how these collections associate with the art archival efforts of precedent to best prime them for conservation and preservation going forward.

:: NEW MEDIA AS A POST-MEDIUM ART ::

However nebulous and fatefully dated the genre of "New Media Art" might be, the name persists as an accurate umbrella to categorize artworks enabled and created by technology. In New Media, the domain of the artist and the engineer fuse to produce all manner of photographic, filmic, video, virtual reality, computer generated, and otherwise technical pieces. New Media art, in its early stages even now, is a hybrid product of several interlocking and overlapping disciplines, including science, technology, and philosophy. This overlap led Lev Manovich to assert that the engineers of our time are the avant-garde artists, who participate and contribute to new media art and blur the traditional fault lines defining artistic and cultural production. Such pluralism in art presents essential complications when one attempts to define what is in fact, *new* media.

An author of several books on the subject, Christiane Paul writes that "the digital medium's distinguishing features certainly constitute a distinct form of aesthetics: it is interactive, participatory, dynamic and customizable, to name just a few of its key characteristics. However, the art itself has multiple manifestations and is extremely hybrid."[13] Unlike traditional artworks, "new media art seems to call for a "ubiquitous museum" or a space that is open to artistic interference--a space for exchange, collaborative creation, and presentation that is transparent and flexible."[14] As such, the method for classifying, archiving, and cataloguing New Media remains subject to the particular challenges that these same characteristics present; ultimately New Media is unstable in its scope and in its semantic modifiers.

---

[12] Charlie Gere. "New Media Art." *Art Book* 12, no. 2 (May 2005), 6.
[13] Christiane Paul, Chapter 2: Digital technologies as medium, in *Digital art (*London: Thames and Hudson, 2008), 1.
[14] Christiane Paul, Challenges for a ubiquitous museum: From the white cube to the black box and beyond, in *New media in the white cube and beyond: Curatorial models for digital art:* 53-75 (Berkeley: University of California Press, 2008) 58-9.

Perhaps exceptional in its deliberately vague definition, New Media Art distinguishes itself from previous art periods and demands new protocols for art handling and archival collection making. New Media theory supports this departure, and promotes the position of the collective majority over the elite *Académie*. Thus, it invokes the structure for a new archival protocol to suit new media archival practice. Whereas previous art genres supported an archival counsel or Academic institution and an educated team of conservation experts, new media conservation increasingly relies of a broader populace for preservation. Musing about the still nebulous state of "new media" as a defined domain, Roger F. Malina rejects any concept of a "Digital Salon" and asserts that "early practitioners of machine art, algorithmic art, electronic art, computer art, digital art, Web art and new media art have shared few things except the use of the computer itself; their goals and practices differ widely and they do not share a common aesthetic."[15] The very considerations of aesthetics and hierarchy of practice are thus muted in an artistic domain beyond such media type genre hierarchies. Our systems and procedures for preservation can be no more generic or prescriptive; they must adapt to the custom culture of a post-medium art period. Further, the institutional and elite constructs that previously governed, prioritized and managed art conservation[16] initiatives no longer reside in the archival discretion of the Salon or Academic realms of precedent. New media demands post-medium preservation beyond any pretention or institutional construct.

For this reason among others, theorists like Domenica Quaranta have defined this artistic period as "post-media" where complexity and variety of media types is such that media itself is no longer a category for eliminating art from the genre.[17] New media remains ultimately inclusive, decidedly uncertain, ever in-development; it invites collaboration and collective contribution; it complicates conservation. And while a change in terminology seemingly does little to alter policy or practice, the equation of "new media" with "post-media" does well to highlight its undefined status in art history. This type of post-medium perspective is not new however; it echoes throughout the commentary of Simon Penny (1999), whose reading of Jack Burnham's *Systems Aesthetics* (1968) pulls on allusions to Conceptual and Minimalist art for a "*post*-object art" to align with *post*-medium works. Published in *Sculpture*, a publication named for its medium of focus,[18] his article embodies in its very publication venue the transmedia

[15] Roger F. Malina, "The Stone Age of the Digital Arts," 464.
[16] These "constructs" reference Academic and institutional systems governing what "art" might be socially endorsed and economically endowed with governmental sponsorship. More and more, the community of online users supports a variety of media production types below the radar of the gallery of museum collection, and this practice influences how we might go about curating and preserving collections going forward.
[17] Quaranta, *Media, new media, postmedia* (2010).
[18] Worthwhile to note, though perhaps not at the expense of breaking up this paragraph, artist Mark Napier, later referenced with the Net Art portion of the subsequent case studies was quoted via artist statements saying that

prerogatives of New Media Art, by tackling Burnham's approaches to Software and Sculpture as "systems" rather than distinct media types.[19] Further, Penny calls upon a cocktailed legacy for New Media that distinguish it from the components of technical implementation. How might New Media map to existing archival collections, so quickly categorized by classical distinction between painting, drawing, fine or deco arts? How might we further understand New Media vis-à-vis its post-material status?

Taking some cues from previous media studies, the instantiation of "post-media" seems a natural progression, and a significant one for those who intend to author the pathways for preservation from this theoretical foundation. Commenting on our post-modern perspectives toward memory in media, Domenico Quaranta writes extensively about software as a domain in constant flux, "always pointing to the next version and the last version, but somehow understood to the same over time."[20] Likewise, *Postproduction Art*, coined by French critic Nicolas Bourriaud predates this iterative trend, citing Duchamp as precedent, while emphasizing that new media implies new approaches to manipulation, remix, sampling, inventory.[21] Cultural theory about the place of new/post media and its complexity in the art world can be found in the "medium is the message" thoughts of Marshall McLuhan,[22] in the *Software Blip* studies of Matthew Fuller, in Oliver Grau's *Virtual Art*, in Stephen Wilson's *Information Arts*, in Julian Stallabrass' *Internet Art*, in Christiane Paul's *Digital Art*. Yet a fixed definition of the genre remains to be determined, a codified framework for preserving and maintaining it even more absent. While these publications set the stage for an appreciation of art media output, they contribute to a discourse that remains perhaps too variable, too complex for any one dominant methodology when it comes understanding process and preservation. Post-media or New Media, however it is defined, proliferates and complicates at a rhizomatic and labyrinthine pace. Because it generates from automated and computational systems, it requires an equally large-scale computational approach to preservation, not one necessarily defined by a single art theorist or art historical methodology.

"[s]oftware design has a very sculptural quality," so too, the echo between new media and other media types (sculpture included) figures into the practical discourse for this art genre. Though not treated here, it is valuable to acknowledge that while often focused on computer technologies, new media at its core might include all "technologies," spanning the realms of the paintbrush and the writing pad if so extended, see Mark Tribe, "Art in the Age of Digital Distribution," New Media Art, (Köln: Taschen, 2003), 10.

[19] Simon Penny, "Systems aesthetics + cyborg art: The legacy of Jack Burnham," *Sculpture (Washington, D.C.)* 18, no. 1 (January 1999): 36-41, *Art Full Text (H.W. Wilson*), EBSCOhost (accessed March 17, 2013): 36-8.

[20] To quote Seth Price, artist/author of the *Redistribution* project (2007) catalogued in Quaranta's work: Quaranta, *Collect the WWWorld: The Artist as Archivist in the Internet Age* (Brescia: LINK Editions, 2011): 11.

[21] Nicholas Bourriaud, *Postproduction: Culture as Screenplay: How Art Reprograms the World*. New York: Lukas & Sternberg, 2002. Accessed March 15, 2012. http://www9.georgetown.edu/faculty/irvinem/theory/Bourriaud-Postproduction2.pdf.

[22] Marshall McLuhan, "The medium is the message" from *Understanding media: The extensions of man* (New York: McGraw Hill, 1964).

By returning to the elements of a few definitions, and briefly touching on the "media" involved, we come to appreciate the unique challenges of this artistic genre and its variable history. Lev Manovich's description in *The Language of New Media* does much to suggest this complexity. Defined as a "meta-media" of arts according to Manovich, New Media Art encompasses digital technology for distribution, data controlled by software algorithms, participatory and collaborative pieces built largely on the "anti-narrative logic of the Web…the result is a collection, not a story."[23] Echoing this anti-media or post-media approach to defining "new media art," Mark Tribe affirms that this genre is "not defined by the technologies discussed here [in *New Media Art*, 2006]; on the contrary, by deploying these technologies for crucial or experimental purposes, New Media artists redefine them as art media."[24] Thus, New Media implies a certain amount of technological manipulation, remix, adaptation, and creative engineering in which case the "media" itself is ancillary, and the "new"-ness of the output resides in the customizable approach to its material makeup. Absorbing multiple related art types including "Computer Art," "Multimedia Art," "Internet Art," "Information Art," and "Digital Art" to name a few, New Media art derives from a variety of ever-evolving technologies: computer software and hardware, applications written in code and constructed from coordinated circuits and chipsets, databases and storage systems, coordinated through the file structures and scripting customs of a suite of languages, and communicated by protocols and services that taken together, represent the intellectual property of a collective and continuous human machine. The very variety of these media reinforce that any attempt to maintain New Media Art calls upon the intellectual input of many, and likely requires a similarly substantial body of conservation contributors. If nothing else, the confusion and arguments around New Media "definition" suggest that its characteristics might be beyond manual, analog, individual or even traditional institutional processing. A new methodology outside the art historical or media-specific approach is necessary to initiate documentation and archival collection of New Media Art assets.

Given the volume and variety of works included in New Media Art, it has been suggested that this artistic era might best inherit a historiography from technology itself. From this suggestion, we might extend the precedent of New Media to predate the Dada and Surrealist movements of the 20th century (which Tribe suggests as the "conceptual and aesthetic root" source of New Media),[25] and go back further to incorporate early computational engineers and even archivists in this lineage of development. As Penny writes, 'new media' implies this

[23] Lev Manovich, "Chapter 5: Database as symbolic form," in *The Language of New Media*, (Cambridge, Mass.: MIT Press, 2001), 2.
[24] Mark Tribe and Reena Jana, Uta Grosenick, eds. *New media art* (Köln: Taschen, 2003), 7.
[25]

dependency or partnership with technology, and the "proliferation of both the desktop computer and the inexpensive microprocessor has completely changed the languages of the art world."[26] In the 1980s, the media associated with "electronic art" dominated in the domains of photography and video production, and many approaches to conservation practice end at this point. While the early mediums of new media, like photography and video, rely on a defined series of processing steps augmented by technological enhancements, cyber art subsumes technology in its language of execution, in its algorithmic construction, in its fusion of multiple visual, audio and virtual effects that create immersive art experiences. In these environments, yet uncharted by formal conservation initiatives, "'[c]ode' is the ephemeral structuring system of the work…a text that is simultaneously a (virtual) machine …a long step from the pragmatic materiality of sculpture."[27]

Even Penny echoes this in his discussion of new media as 'post-medium.' New Media becomes less a carrier of narrative and more as the content and context of its expression where the "ability to carry narrative content is a secondary issue and somewhat superfluous."[28] New Media has the potential to manipulate experience, to produce mechanized immersions wrapped in code, which depending on conservation effort, will migrate to a new medium, a new platform[29] for display. How that platform will be built, what components and fields it will offer for data entry, what information and experiences it will effectively capture, remains to be determined.

Both net-based and networked, New Media depends upon essentially interactive, interdisciplinary and impermanent qualities, informed by a non-hierarchical "rhizomatic" structure for the media it includes, all this renders it a cataloguing challenge as yet left untreated in the realm of knowledge organization. Even provided all of these provisional if broad definitions, the question persists: how does this nebulous 'new media' map into collections and conservation programs? How does it articulate in the discourses of other domains, and if art theory fails to completely define New Media Art, what other disciplines might do so more appropriately?

:: MAPPING NEW MEDIA TO CURRENT COLLECTIONS ::

As the artistic approach to defining new media seems unsatisfactory, an accurate mapping of the new media landscape and a planning for its posterity via preservation might benefit from more historical context. Understanding the timeline of "new media" as a function of historical events situates it firmly in cultural context rather than relegating it in the art world.

[26] Penny, "Systems Aesthetics…,". 38.
[27] Penny, "Systems Aesthetics…,": 38-39.
[28] Penny, "Systems Aesthetics…,": 39.
[29] The "platform" or database for documenting and constructing an archive will be revisited at a later portion of this thesis, but a consideration of Albrethsen's Platform Formalism is assumed, if only to acknowledge that the current platforms for archiving new media are insufficient

Such situation (one might say "site-specific") orientation of this genre is critical, as I will suggest that conservation programs for New Media art must necessarily cull techniques from our collective digital culture. This culture includes the internet, social media, and open source communities, united under an objective to archive the world, or at least, captures of its new media output. For many, this timeline echoes in the timeline of recent technological development, of human computer interaction as its been enacted in the past thirty years. How might we record new media art in an era of media agnosticism (i.e. post-media art)? Perhaps a consideration of technical history rather than art historical discourse will inform an answer.

To this end, general media development feeds a foundation for New Media Art, and computational theory provides some models for approaching new methodologies for preservation. If we begin modestly with an assessment of the past 150 years of technological development, this historical overview subsumes the audio-visual domains of photography, film, and broadcast media as well as electronic communication from the development of the telephone, to the television and finally through the 'telematics' of satellite and wave signaling.[30]

Without delving too deeply into political and economic influencers of media development, an accurate assessment of media history necessarily implies an appreciation for this precedent. Post-media art did not develop in a vacuum, and the truly anti-disciplinary events integral to its fruition cannot be forgotten in this discussion. As this paper pivots toward archives, those topics related to open source, social network structures, and collaborative media systems remain most relevant to the development of preservation theory, if tertiary to the domain of media arts. To this end, New Media Art history retrospects to Adam Smith's *Wealth of Nations* (1776) as an introduction to the free market system and the "self-regulating machine;" it pulls from Karl Marx's *Das Kapital* (1867) and the introduction of power systems to appreciate social network hierarchies. These frameworks pool into Guattari and Deleuze's conceptions of human intellectual and social interactions as they relate to our environments in the *Three Ecologies* (1989).[31] Likewise, media theory from Bertolt Brecht's writings about radio as a communication device (1930), to Walter Ruttmann's studies of film as "time-based media" fusing sound and video (1919) point to the political and psychological repercussions of changing distribution

[30] "Telematics" refers to Roy Ascott's 1990 term for "computer-mediated communications networking involving telephone, cable, and satellite links between geographically dispersed individuals and institutions that are interfaced to data-processing systems, remote sensing devices, and capacious data storage banks." See Roy Ascott,

[31] See especially Guattari's discussion of dominant roles in "mastery over the mechanosphere," Félix Guattari, *Les trois écologies*, trans. (Paris: Editions Galilée, 1989; reprinted in Ian Pindar and Paul Sutton, trans, *The Three Ecologies*, by Félix Guattari (London: Continuum, 2000), 43.

formats in the early part of the twentieth century.[32] Ultimately, the leveraging of these media for political propaganda in various movements (including Communist and Fascist groups) freighted them with additional connotations that affected their reception and usage through the 1960s, when Media Art as a genre became recognized slowly as independent from "mass media" initiatives.

Further development in the theory of media throughout the 1970s builds upon this basis of economic and political thought. Founded in an almost utopian perspective of New Media Art as revolutionary in process and production, media theory adopts a manifesto rhetoric echoing its adolescence in the avant-garde. These political and situational motivations in tandem with contemporary artistic practice formed the foundation for our current systems for communication, and networked manifesto. They remain significant to this discussion, because what we choose to preserve, and the way we choose to coordinate that preservation through collaboration depends on how networks developed from multiple social and politicized programs in media history.

Carrying these politics through to computation, New Media studies would be remiss without acknowledging the interdisciplinary developments in science, math and physics that fed the creation of processing machines. As an important mediator in the production and propagation of New Media Art, the computer follows the preceding dominance of telephone, radio, and film as broadcast and projection media. Its trajectory through military and commercial development led ultimately its use as an art-making device and facilitator of human interaction. Progress in electronic technologies from George Stibitz' etymological coinage of "digital" in 1942[33] to Charles Babbage's failed but prototypical "Analytical Engine" as an early computer led to the translation of telecommunications and military technologies into solid state electronics and software powered systems that we employ and build on today. Such progress irrevocably altered the fabric of media production and the tempo of human behavior. The 1930s and 40s laid the groundwork for this, enabled by Alan Turing's (1912-1954)[34] proposal for the "Turing Machine" (1937), upheld as the proto-computer, a central processing unit (CPU) augmented by algorithmic logic. Contemporary with this, Walter Benjamin's (1892-1940) *Art in the Age of Mechanical Reproduction* (1936)[35] began to question the distribution potential and political possibilities of art,

---

[32] For more on Brecht and Ruttmann's media theories, see Dieter Daniels, "Media ? Art / Art ? Media: Fore runners of media art in the first half of the twentieth century." *Medien Kunst Netz* (2004), accessed March 29, 2013, http://www.medienkunstnetz.de/themes/overview_of_media_art/forerunners/.

[33] Brian Randell, ed., *The Origins of Digital Computers: Selected Papers* 2nd ed. (Berlin: Springer-Verlag, 1975).

[34] Also, see the work of Konrad Zuse, who wrote about a contemporary (1936) and similarly structured computation machine: Konrad Zuse, *The Computer—My Life*, translation of *Der Computer, Mein Lebenswerk* (New York: Springer-Verlag, 1993), 44.

[35] Significant to note, 1936 marked an important year for information theory, including in its tenure a remarkable amount of events relevant to science: Konrad Zuse's proposal for a Z3 computer, Benjamin's essay, the "discovery" of dark matter by Fritz Zwicky via the virial theorem. The simultaneity of these events does not presume their association, but rather notes their correlation as an indicator of particularly thoughtful developments in science and technology.

effectively grounding the developing computer in the same interdisciplinary political significance of preceding media types.

On this political trajectory, theories continued to develop about the precarious and provocative place of New Media Art in our world. When describing the properties of New Media, Hans Magnus Enzensberger (1974) writes that "new media are oriented toward action, not contemplation; toward the present, not tradition…completely opposed to that of the bourgeois culture, which aspires to possession."[36] He cites Bertolt Brecht in questioning derogatory 'utopian' assumptions about media while emphasizing that it is not the "preserve of a scholarly caste."[37] Such lack of pretention and hierarchy distinguishes New Media at its roots from the stereotyped elitism of fine art. It also underscores the type of collective (versus institutional) archives that might characterize its preservation. This perception of new media as "egalitarian in structure"[38] incorporates Deleuze and Guattari's approach to media organization as rhizomatic,[39] rather than hierarchical. In this, it echoes the internet, and as such, demands a contemporary approach to conservation that accounts for and mirrors our contemporary perception of networked organization.

In the flat structure of the network, we will find an archive utopia turned feasible topos,[40] a solution to our ongoing preservation woes that distributes work across a non-hierarchical plane. However unachievable it may seem, new media preservation potential opens the confines of traditional conservation from the domain of institutional silo to the "social" public, where banked information is accessible to anyone as Enzensberger predicted.

The correspondence between these theories of politicized art-making and the technical developments in engineering fostered a newly-defined field of information theory, one that would profoundly iterate in technical and artistic developments to come. Vannevar Bush's (1890-1974) "As we May Think," contributes to this dialog as a poignant publication about the consequence of uncontrolled information overload as a result of electronic engineering, in the same way that his

---

[36] Hans Magnus Enzensberger, "Constitutents of a Theory of the Media," *New Left Review* 64 (Nov/Dec 1970): 13-36, reprinted in *The Consciousness Industry*, trans. Stuart Hood (New York: Seabury Press, 1974), 17-19.
[37] Ibid., 17-22.
[38] Ibid., 22-25.
[39] It is not insignificant, though perhaps inappropriate for complete digression at this point, that Rhizome.org is the archive for New Media initiated by the New Museum (NYC). More on the rhizome mission to "mitigate obsolescence while respecting artistic intent" in the final section of this paper.
[40] Topos etymologically from Greek for "place," utopia being from the Latin for "nowhere," or a derivative of the Greek negation + "place." As this archival initiative is feasible, I argue for the conversion of what has been characterized in media theory as utopian to possible, that is, robust preservation or media theory understanding is within the realm of possibility.

prototypical Memex machine[41] for information processing provided the foundation for our expectations in computing [Fig. 5-6].[42] Thus, technical development balanced with critical consideration of how and to-what-end information might benefit from computational communication and calculated processing. Bush was not alone among the engineers who emphasized changing ways of information and narrative processing as opposed to only mechanical calculation. As the "father of information theory," Claude Shannon (1916-2001) authored a thesis on Boolean logic for computational problem solving (1948)[43] which pushed the "digital paradigm" of the 1930s into the realm of human-computer interaction, and ways for negotiating human control of complex media." [44]

Slowly, these systems have democratized to be used by the average person, thus contributing to the digital information age and state of networked intelligence from which we now profit. From the cybernetic[45] theories of Norbert Weiner (1894-1964)[46] to Douglas Engelbart's (1925) invention of the computer mouse and hypertext as a practical mode of linking between locations (or nodes) on the internet, the landscape of digital navigation trends to a more open network. Sped through a few decades, the conversion of human operators to operating systems, and the rise of commercial computing powered by solid-state electronics changed the social landscape. How we interact on the internet stems from the development of data processors which "brought computing out of the computer room and into the hands of the user" and further enabled our virtual transactions via transmission protocols passing packets of information from one node to the next.[47] With the advent of the microprocessor and the personal computer, the hardware of computing spread, and continues to iterate as a component to even quotidian tasks in our contemporary world. Integral to this progress, the work of Tim Berners-Lee (1955-), famous for proposing the Internet in 1989 and developing our interaction with it as a GUI "graphical user interface," piloted the development of the internet through to a utopic vision for the semantic web.[48] Thus the computer and networks became a significant substrate to New Media Art and life,

---

[41] Bush's work at MIT also involved the development of the Differential Analyzer, an analog computer built to solve differential equations, though, the Memex provides a more hypothetical and for this essay, relevant example that compares to how we organize (read: archive) information via computers.
[42] Vannevar Bush, "As We May Think." *The Atlantic Monthly Group* (July 1, 1945), accessed January 10, 2011.,http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/.
[43] Claude E. Shannon, "A Symbolic Analysis of Relay and Switching Circuits," *Transactions of the American Institution of Electrical Engineers* 57 (1938): 713-723.
[44] Paul E. Ceruzzi, *Computing: A Concise History* (Cambridge: The MIT Press, 2012), 42-44.
[45] Cybernetics defined by Weiner relates to power structures in this digital landscape as "the scientific study of control and communication in the animal and the machine."
[46] Norbert Weiner, *Cybernetics, or Control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948).
[47] Jamie Parker Pearson, ed, *Digital at Work* (Bedford, MA: Digital Press, 1992), 10-11.
[48] Tim Berners-Lee, *Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web* (San Francisco: Harper Collins, 1999).

while altering the relational and communications capacities of our social environments. Preservation initiatives might do well to recognize this, in designing systems for distributing digital conservation across a broader network than the museum space.

Still, planning for preservation leads to questions about the scope of such a network. Increasing prevalence in audio visual art production led Dieter Daniels to blanket "all modern art [as] media art."[49] In his essay 'Media ? Art / Art ? Media: Forerunners of media art in the first half of the twentieth century,' he writes about the speed and montage aesthetic of these aforementioned graphic forms as affecting how all art and modern mass media propagates. Characterized largely by greater accessibility, interdisciplinary and simultaneity qualities that inform production, media art suggests an ephemerality amplified by newer modes of distribution, such as those achieved by broadcast and signal-based artworks. In discussing propagation, Daniels also suggests modes for processing and, as I will suggest, *preserving* artworks. Broader venues of communication prime new and post-media works for mass distribution. Thus, they do for digital art what the printing press and pamphlet distribution achieved for political messaging in the nineteenth century manifestations. Our revolution will be thus computerized, and the networked potential of those systems for preserving digital art projects independent of media type is suggestive of the type of collaborative archives we might build to house future collections.

Even with an abbreviated history mapped across media, however, the scope of New Media archives seem at best unconstrained and at worst bloated and beyond control. To mitigate what seems like an impossible task, archiving an impossible in-finite collection, we might return to the distinction of this art from its media (as the 'post-media' terminology suggests). Previous preservation initiatives and historic retrospectives created delineations between works based on media: print photography requires an understanding of its media history; its chemical constituents remain part of its preservation as a work on paper. Archival efforts remain rightly tied to the physical. Film also calls for an appreciation of its physical makeup and its media constraints for preservation. However, with New Media, particularly web-bound pieces, the diversity of media types precludes the utility of this media fixation until an appropriate standard for documentation can be established. A post-media archive will necessarily need to adapt for multiple media types, and its construction as an ideally networked initiative will cull from the combined intelligence and capabilities of a range of media experts. Diversity in this expertise remains manageable so long as many mobilize to its service, a condition of crowdsourcing already proven by social

[49] Dieter Daniels, "Media ? Art / Art ? Media: Forefrunners of media art in the first half of the twentieth century." *Medien Kunst Netz* (2004), accessed March 29, 2013, http://www.medienkunstnetz.de/themes/overview_of_media_art/forerunners/.

networks.[50] Thus, in these mapped networked environments, we begin to uncover the archival systems to house the digital assets and artworks in question.

The value of mapping metaphors in this new networked landscape cannot be ignored. Archives and institutions for recording, documenting, or preserving media architect their systems with metadata maps that provide wayfinding services for navigating unknown territories of information. According to a recent MIT Media Lab study on the development of privacy law and theory as mobile devices become more prevalent "it is estimated that a third of the 25 billion copies of applications available on Apples's App Store access a user's geographic location, and [further] that the geo-location of ~50% of all iOS and Android traffic is available to ad networks."[51] The supposition and relevant conclusion remains that we are slowly developing dependencies on systems that link physical environments to virtual worlds; these data are actively collated with our unique navigation patterns and behaviors in both environments, and already actively mined by commercial entities because the information that this mapping provides is so good. Our identities connect easily to these behaviors and movements, and preservation policy for digital posterity can, and likely should respond to this emphasis on mapping and data. The kind of crosswalks that connect our digital behaviors to our natural topographies are the same or similar to those that logically can connect content and build digital relationships (edges) between entities or art (nodes) in a database (archive).

In this way, maps have a shared rhetoric with metadata management. Firstly, there is a comparable attraction to structured trees, hierarchies and diagrams in terms of organizing information. As humans, we have a natural affinity for anchoring the overwhelming content of our cyberscape in a familiar terrestrial context, so structures and software that geo-tag our content and embed it in map conceptualizations of our analog environment are incredibly valuable. Consciously and unconsciously, we develop schemas for processing our world. Formal metadata maps for creating library and institution catalogs are no longer the sole standards of archival impulse and the processing of these data are becoming increasingly pedestrian. On a weekly basis our human output of data ranges in the exabytes, and we submit these data to our own adhoc systems of analysis, funneling it through a variety of proprietary technologies for processing. Thus hierarchies of archival practice are collapsing to include broader communities of average

[50] This is not to say that building an archive would be entirely effective without additional motivation for participants, but rather that systems like Mechanical Turk for distributing repetitive or simple tasks across a networked community, or Wikipedian efforts for building out reference material via user-generated and user-initiated submissions have proven effective at fleshing out encyclopedic initiatives. There is little reason not to apply a similar model to archival studies, rather than more traditional systems of conservation/preservation which saddle one or two conservators with an entire body of work, for which more than superficial mastery of a few media could not be expected.

[51] Yves-Alexandre de Montjoye, et al. "Unique in the Crowd: The privacy bounds of human mobility." *Scientific Reports* 3: 1376 (March 25, 2013): 1

individuals untrained to archive but reflexively attracted to making maps. And this community of cartographers will prove the architects of our next generation of information systems. Understanding how best to harness that intelligence is the domain of the post-media preservation specialist.

Even beyond the consideration of maps as markup for computational structures, the use of maps in production provides standards on which to develop an archival practice. From Borges' map of the world the size of the world to Aby Warburg's *Mnemosyne Atlas* (1925-29), [52] the artistic precedent for charting collections in mapped metaphors persists throughout our visual history [Fig. 3-4]. As I have suggested however, our structures for mapping information and collective knowledge have shifted in this new digital landscape. Like programming, which has developed from strict procedural logic to adopt modular and object-oriented flexibility with the development of new languages, so too our semantics for understanding information and data structures has evolved toward less-rigid models of organization. Our way of remembering and maintaining that information echoes this evolution. Now accustomed to networks and rhizome structures that develop organically rather than hierarchically, we shift our paradigms for knowledge storage and memory mapping to match.

As a recent article in the Nieman Lab journal suggests, "[t]he problem, however, isn't that we've grown complacent about the nature of knowledge, but that the nature of knowledge is changing in the context of networks."[53] Our archives align less and less with the Cartesian "vision of knowledge as paradigmatic, structured, ordered, like the hierarchy of the church and the deputations of sovereignty, [which] was very much a product of encyclopedism's golden age, the eighteenth century." As Battles' article, "Knowledge is the Property of the Network" attests, the construction of the encyclopedia when released from hierarchical structure dually releases it from the elitist constructs of political and institutional precedent. From here, we have adopted the archive and the encyclopedia to a more open and collaborative platform. Within this new encyclopedic impulse, the countercultural and pseudo-political messaging of New Media's legacy in technical and art historical developments achieves a newfound relevance. Battles goes on to isolate mapping as a significant effort in this retrospective endeavor:

---

[52] In this case, the *Mnemosyne Atlas* represented one of Warburg's "visual clusters" where the arrangement of photos to illustrate themes in an assembled atlas might be compared to the relational logic of visual search via an internet search engine. For the latter, algorithms auto-populate the browser based on proximity to a keyword reference, the more sophisticated the algorithm, the more appropriate the cluster. For Warburg, clusters were the product of visual symmetries and agreeable proximity was the product of subjective judgments rather than computation. In both the arrangement is calculated.

[53] Matthew Battles, "Knowledge is a property of the network: Mapping Britannica's world in a Wikipedia age," *Nieman Journalism Lab* (March 20, 2012), accessed March 23, 2012 http://www.niemanlab.org/2012/03/knowledge-is-a-property-of-the-network-mapping-britannicas-world-in-a-wikipedia-age/.

> "Indeed, mapping is woven into the very structure and method of Wikipedia itself; it isn't found in orderings and topics, but in the network-locative irruptions of facticity and assertion, citation and correction that make up the entries."[54]

Our method for mapping information digitally trends toward Wikipedia, a crowd-sourced[55] archival effort that "maps knowledge as ambitiously as the encyclopedia of old; only its cartography is different." It implements a collaborative system of version control that increasingly characterizes how we manage information online: through obsessive, collaborative, and voluntary drafting. This new paradigm for drafting our new media archives will architect via user generation; in this way, we will universally tackle what was at one point presented as a malignant issue of archiving complicated and mediated works of our contemporary artistic climate. Knowledge then, is no longer the domain of a conservation institution, but rather that of the global village,[56] the networked infinite of our digital landscape fed by international intelligence.

Ultimately, New Media or post-media can be defined as a 'meta-media'[57] where image and art making is related to culture. If then, the artistic output of this genre can be considered in terms of historic as well as art-historic progress, then it extends from a long lineage of technological developments in engineering and human theory. It builds from the economic and Enlightenment foundations of free markets and archival collections from the eighteenth century; it rests on the technical foundations of telephonic and telematic networks built from the mid-nineteenth century through 1930s, and it extends the open systems and media messaging of the 1960s and 1970s. In this way it absorbs the experimental aesthetics of E.A.T. and performance art (1965-66), the energy of underappreciated but now iconic exhibitions like London's *Cybernetic Serendipity* (1968) and Jack Burnham's *Software* (1970), and it continues down the "information superhighway" coined by artist Nam June Paik in 1974.

Architected on a shared foundation between computing and social studies, it makes sense that the restoration and archiving of that architecture would build on a network that bridges those environments (computing and social science), those ecologies, to productive and profound ends.

---

[54] Ibid., see also David Weinberger's *Too Big to Know: Rethinking Knowledge Now That the Facts Aren't the Facts, Experts Are Everywhere, and the Smartest Person in the Room is the Room* (2012).
[55] "Crowd-sourced" defined here as a neologism for the utilization of the "crowd" as the "source" for some work to be done.
[56] The "global village" used here references Marshall McLuhan's term that describes how electronic media have increasingly collapses physical topographies to village locality, making connect speeds between distances almost instantaneous, see McLuhan, "The medium is the message" from *Understanding media: The extensions of man* (New York: McGraw Hill, 1964).
[57] See Lev Manovich's previously cited use of this term; Lev Manovich, "Chapter 5: Database as symbolic form," in *The Language of New Media*, (Cambridge, Mass.: MIT Press, 2001): 2.

Social networks do as much, unifying and mobilizing the collective contributions and computing power of remote collaborators across our physical ecology via our virtual world. Using the power of networked individuals harnessed for collective purpose, conservation programs can hope to tackle the technical challenges of post-media preservation with collaborative force. Archiving artworks generated by machines might logically require that we build bigger machines, human machines mediated by computer networks to process artworks or artworked systems for preservation. Thus, we pass to the next section of this theoretical preface, and treat the "archive" as an archetype due for reinvention, before diving into a few case studies of how such preservation needs present themselves in practical artworks.

.: CHAPTER II :.
MODEL ARCHIVES: THE MISE-EN-ABYME OF NEW MEDIA ART

"If coding is simultaneously saying something and doing it, what came before?"
- Geoff Cox, *Speaking Code*, 2013

-

"Mise en abyme is a term originally from the French and means "placed into abyss"… [i]n Western art history, "mise en abyme" is a formal technique in which an image contains a smaller copy of itself, the sequence appearing to recur infinitely."
- Wikipedia, definition for "mise_en_abyme," accessed 4/16/2013

In the context of code-writing, an understanding of historic precedent seems a deceptively abbreviated study. As much New Media Art implies an interaction with computer code and the programming of technologies, it seems that preservation efforts would necessarily focus on developing a detailed understanding of this history. Then from this precedent, developing an accurate program for diagnosing issues of obsolescence in code production would precede any necessary maintenance. With such a short history enacted in the last century, new media studies would seemingly have a less daunting task for developing preservation initiatives. Yet, when facing the proliferation of pieces coupled with the democratization of art-making across a complex network of technologically enabled virtual environments, the task of preserving Post-Media Art presents one of the greatest challenges to archival systems to date.

Returning briefly to computing history, we might discover a vague explanation of this paradox in preservation. In his book *Speaking Code*, Geoff Cox suggests that New Media and code-based works might be inherently anti-history, that is, they exist in a liminal space between what has happened and what can happen when code is executed, so their iteration is timeless. Thus, our paradigm for organizing information out-of-time and without historic scope shifts our reflexes for technostalgia and art archiving. With the rhizomatic[58] or non-hierarchial rootlike structure as a model, the archival impulses of contemporary art-making might well derive from the mathematical graph structure echoed in the internet, the social structure that networks connections on facebook and other social media venues. Composed from the aforementioned theories of Guattari and Deleuze, the rhizomatic graph presents an interesting model for the modern archive, and incidentally became the name of the New Museum's digital archive, Rhizome.org.

What Cox cautions in suggesting that code art might reject history remains integral to any discussion of how we might proceed with preservation. If our present and future practice for

[58] In botany, the rhizome represents a horizontal root structure. In philosophy, the rhizome is a concept developed by Gilles Deleuze and Félix Guattari in their *Capitalism and Schizophrenia* (1972-1980) project. It is what Deleuze calls an "image of thought," that describes theory and research that allows for multiple, non-hierarchical entry and exit points in data representation and interpretation.

preserving New Media Art follows from this non-procedural and potentially non-structured archival system, how might we best harness this system structure to archive appropriately? What form of archiving is appropriate?

A kind of mise-en-abyme (or Droste effect) is implied in this code recursiveness[59] to which Cox alludes, where "[h]istorical processes can be understood as phenomena that are analogous to the inner workings of wider systems; they express ongoing processes of development and complexity, beyond the reach of a linear narrative of progress or a straightforward accumulation of knowledge."[60] For New Media Art and preservation, this implies that a genre of artworks built on principles of recursion, iteration, and versioning[61] might best benefit from an archive that echoes this construct. Claude Shannon proves as much in his experimental exercises with information entropy, a field of computer science defined by the study of the "unknown" in a problem set. His 1948 paper, " A Mathematical Theory of Communication" proposes a type of entropy focused on the optimal lossless encoding of communication; his formula for encoding messages derives from the Markov property, colloquially referenced as the "memoryless" property. Markov processes suggest that variables focused on the future need not necessarily reference the past. This raises the question, however strained it might seem: is New Media inherently oriented toward a "memoryless" understanding of information? If so, is archival practice even necessary? How can we know?

A quick rereading of recursive processes gives us an answer. In code, entropy is not a hopeless condition, nor is recursion an endless spiral into the abyss. Rather, each is a hopeful metaphor for any preservation endeavor, which like an echo, hopes to iterate functionally within its own definition if only to allow its audience to relive its original form with each iteration or utterance. Repeating in a self-similar way (mise-en-abyme in scope) informs how conservators of digital art have approached *migration* of one technology to a new platform or hosting solution; it informs how artists and archivists have written software analogs for *emulation* to "echo" the original artwork in a newly updated articulation. As the Guggenheims's *Seeing Double: Emulation in Theory and Practice* exhibition (exhibition at the Guggenheim NY, March-May

[59] This notion of recursiveness is indicative to programming, where a recursive function is one that repeats itself indefinitely.
[60] Geoff Cox, *Speaking Code: Coding as aesthetic and Political Expression* (Cambridge, Mass: MIT Press, 2013): 42.
[61] Versioning references a practice in programming that translates to "drafting" in writing. A block of code might enter into a collaborative versioning environment like Github™, where different programmers can contribute to the same program by submitting changes that are accepted and integrated or reviewed, altered, and applied by an administrator. This practice of collaborating on the same coding event contributes to the overarching suggestions of this thesis, that coding systems might provide a framework for collective archival initiatives in constructing and 'versioning' archives of New Media Art information.

2004) suggested, these remain two viable forms of new media preservation.[62] Still, for mass archival effort, both migration and emulation fail to scale for the entirety of new media conservation initiatives. New Media as a global and sizable genre requires an archival engine fueled by an international networked population of contributors; it requires a mathematical graph, a rhizomatic database of utopic proportion to document the complexity and persistent entropy of our post-medium condition. Perhaps in contrast to a gestalt theory of organization, where the 'whole' might be perceived as greater than the sum of its parts, the archival whole that collects a sum of new media artworks might best articulate as an echo of its constituents.

Still, if we depart from theory and return to historic analysis and ultimately, a practical approach to preservation, this speculation into the philosophical construct of the idealized archive collapses. Delving into utopias and theory does not a roadmap to productivity make. However, in acknowledging these theoretical and thematic approaches to code-based artworks, we recognize a history that influences our priorities for information organization as a culture. By assessing these foundational thought processes, we might appreciate how "memorylessness" and information entropy determines what we choose to save, and how our predispositions to forget in programming might affect our perspectives on preservation. Thus, this paper proceeds with the question, what then can we remember about a media culture so content to echo obsolescence?

Attempting to map the trajectory and preservation program appropriate for New Media Art, or artworks largely architected in or influenced by code, it seems reasonable to incorporate some of the more rhizomatic paradigms of contemporary code writing to build out a narrative of the ideal archival system. To do this requires some delving into information theory in tandem with practical procedures for tackling typical archival issues, but before embarking on an architecture of the ideal archival system for New Media Art, it is appropriate to consider how archives iterate in our current art conservatories, and how they might best accommodate New Media works.

With this turn to archives, it is important to acknowledge that preservation efforts extend beyond the realm of documentation. Still, for the purpose of this paper, documentation and meticulous metadata when maintained by a global network become the de facto foundation for some of the most ambitious preservation initiatives to date. Historically, conservation efforts embraced invasive but effective forms of reinterpretation or restoration of artworks to preserve appropriately. A focus on documentation, on the appropriate archiving of artworks not via invasion or necessary emulation to a new platform, but rather by documenting experiences in persistent formats seems the most appropriate approach; multiple media assembled by networked collaborations will provide the formula for future preservation. Thus, this portion of the paper

[62] Accessed March 29, 2013 via http://variablemedia.net/e/seeingdouble/.

focuses on how archives store information, their legacy in information history and their utopian objectives mediated by a healthy dive into the information theory of entropy and memory topography.

By building an archive timeline, we can appreciate the multiple disciplines that inform an encyclopedia structure of the archetypal archive. Preservation efforts in libraries and museums historically emphasize the maintenance of art integrity, the preservation of original materials, avoiding the alteration or restoration of pieces. These paradigms for preservation persist in most conservatories of culture and memory, but as art immerses further into the nebulously defined New Media, preservation will require new protocols. Art of the post-natural, or technological, space accelerates decay, relying on interactivity and platform/software dependencies that render it infinitely mutable and almost immediately vulnerable to obsolescence.

As noted in previous sections, in mapping our collective online presence, there is an interesting relationship between our digital and physical worlds. Though we started using computers to process and store via static terminals, we then migrated to an open publication venue for that content that can be viewed from (almost) anywhere (still submitted through our local machines), and then finally the Cloud such that our authoring publication venue is no longer localized to one terminal, but is mobile, and flexible to accommodate our own kinetic impulses. Yet even as we move to network all of our physical devices to an open and accessible platform in the Cloud, we savor a social interest in linking our virtual selves to a physical world. We check in via Foursquare and use GPS to connect us to resources, people, and products in proximity, we log our locations with our internet commentary and date our posts in an attempt to archive our internet personae on a timeline of social media. These paradigms for mapping our location describe a pattern of behavior that proves useful vis-à-vis preservation; if we are content to map our lives digitally, then our cognitive surplus[63] be might easily be harnessed to map our history, and in particular, our art history, virtually.

Despite our digital ubiquity, we enjoy localizing our internet identity to a recognizable cartography of information. And this is where the world of library and information science adds structure and order to a potentially chaotic and clouded world. We have looped from physical fixity, to media variability, back to an interest in acknowledging our own fixity while remaining connected to a variable network. We want it all, and we expect our art and our media and our general environment to accommodate this. Preservation thus, needs to accommodate the

[63] 'Cognitive Surplus' is Clay Shirky's term for the excess in intelligence that people now have in their freetime, for enacting "creative" rather than " sonsumer" activities, largely enabled by efficiencies in technology. Shirky, "Ontology is Overrated: Categories, Links, and Tags," *Clay Shirky's Writings About the Internet*, 2005, accessed May 2011. http://www.shirky.com/writings/ontology_overrated.html.See also Shirky's Here Comes Everybody (2010), about the impact of social media on on our world.

complexities of this archival impulse. However simplified, this trend persists: that we have moved back to making our digital environment more physical, more mobile an accessible from our physical locations, more social so as to mimic our real-life networks but amplified to a web of relationships.

To its credit, New Media Art does not lack precedent in artistic emphasis on "archival impulse."[64] The works of collector-artist-archivists like Marcel Duchamp with his *Boîte en Valise* [Fig. 1] a "portable museum," Kurt Schwitters with his *Merzbau* assembled monuments, Hanna Höch's *Album* (1933), and Joseph Cornell's collection boxes all point to the beginning of a legacy in artists as archivist. Neither does New Media lack in theoretical backbone to archival practice: the works of librarians like Paul Otlet, Jorge Luis Borges, the writings on libraries from Walter Benjamin, Derrida, Foucault all point to an artistic anchor in the archive. Each provides perspective on the collection aesthetic of our post-modern area. At present we teeter on the precipice of a new system for meaning making by preserving New Media Art's unraveling history, and a consideration of the history of media might help define an approach to archival practice moving forward.

From Clement Greenberg's assertion that the meaning of art (painting/sculpture) roots in the object, to Post-modern art's focus on meaning in context and concept, we arrive at a New Media messaging that divorces signifiers and signified[65] from media itself. Post-media art fits in this evolution of semantic discourse wherein "[t]he computer is most often the idea rather than a medium in itself."[66] Throughout "Inventing the Medium," her introduction to the New Media Reader, Janet Murray tackles a definition of new media culled from both technical and theoretical domains, addressing the genealogy of the "digital medium," while citing historical, humanistic and scientific reference points in computer chronology. Using the metaphor of the labyrinth on the quest for technological progress, Murray discusses the mapping of "information processing" as the product of both scientists and story-tellers.[67] In so doing, she reinforces a dichotomy between the scientific and the humanistic aspects of technological progress, often citing them as antithetical "rivals" rather than symbiotic collaborators in new media development. For Murray, scientists (like Vannevar Bush) represent the forward thinkers and humanists (like Jorges Luis

---

[64] "Archival impulse" refers to Hal Foster's term for the multiplicity of "collection" and "a2010)rchive" art examples in contemporary art production, see Hal Foster, "An Archival Impulse," *October* 110 (Cambridge, Mass.: The MIT Press: 3-6) 21-2, 2004.

[65] Perhaps cheaply, this alludes to Ferdinand de Saussure's linguistic conceptions of meanings captured in the "signifiant" and "signifié" aspects of semiotics. Though not a necessary digression here, the theory of sound and spoken meaning versus written or suggested connotation, and all of the complexity in between informs much of the theory of Media Studies, and in the context of defining "media" art, this remains a relevant allusion.

[66] Michael Rush, *New Media in Art* (London: Thames and Hudson, 2005): 211.

[67] Janet H. Murray, "Inventing the Medium," introduction to *The New Media Reader*, by Noah Wardrup Fruin and Nick Montfort, eds. (Cambridge, Mass.: MIT Press), 2003, 9.

Borges) represent the utopic dreamers who, together, make technological media progress. She thus identifies four characteristics of New Media, including an emphasis on its procedural, participatory, spatial, and encyclopedic qualities. The last of these provides segue to perhaps the most intriguing perspective on New Media Art, for in citing the "encyclopedia" as a comparative, she invokes an archival construct: a catalogue, whose reference suggests that preservation might do well to shift from art institutions and toward the domains of library and computer sciences, however utopian or labyrinthine their development.

To this end, the construction of computer and networked systems, of catalogues and encyclopedia databases might always map to a seemingly utopian or labyrinth-like vision. While analogies that suggest how architecting such systems might prove insurmountable, overly complex, or unattainable do not seem productive, they in fact provide us with useful paradigms toward progressive ends.[68] By investigating this legacy, we might well note the other utopian conceptions that the internet has since made manifest, and appreciate that a system for archiving new media remains within our grasp.

In many ways, new media seems historically rooted in utopia, as it often questions what is possible rather than what is actual. To revisit Claude Shannon's thesis, much media product is more about entropy than utopia.[69] Entropy being the quality or measure of uncertainty in a variable, or the unknown value of information in a message. The topography of New Media is entropic in this way, taking cues from environmental art which embraced notions of entropy and 'non-site.' Considering this refocus on "place" and site-specific art, New Media entropy implies Guattari's *The Three Ecologies* in advocating for the importance of environment,[70] one among the three ecologies that also include the mind and society. Though the larger argument of this work addresses the impact of politics and psychoanalysis on our interaction patterns and behaviors, the relationships between these three places provide context for new media preservation. By harnessing two of the three at the service of a digital ecology, Guattari's theory might be adapted as a more modern paradigm for new media preservation, an improved environmental system where the task of environmental archiving at the bit level is adopted by the collective intelligence (mind) of the social community online (society). The purpose of this philosophical perspective

[68] Etymology in this case reminds us that utopia originates from the latin for "nowhere," the Greek for "not" (u-) "place" (topus), and via Thomas Moore's 1516 book from a concept of a non-existent or dream environment sustained on visionary idealism. Likewise "labyrinth" is laden with the mythical implications of Daedalus's complex and intricate structural puzzle to host the Minotaur, a maze that bewildering and entraps.

[69] Claude E. Shannon, "A Symbolic Analysis of Relay and Switching Circuits," *Transactions of the American Institution f Electrical Engineers* 57 (1938): 713-723.

[70] Ian Pindar, and Paul Sutton, trans., *The Three Ecologies*, by Félix Guattari. (London: Continuum, 2000), 5.

might be to anchor an ephemeral or utopic ideology in a physical space, in a discrete series of environments or ecologies so as best to conceptualize what had been cataloged as unachievable.

To this point, the utopic theories of how technology might develop and how we might harness it for archival practice are myriad. In the Technologist Ted Nelson (1937-)'s *Project Xanadu* (1960), the first "hypertext project" proposed that we make the notion of shared knowledge explicit by suggesting an architecture for our internet environment with parallel documentation and *transclusion* or *translinks* to build hyperlink relationships between entities. Part of the now common parlance of our internet interactions, his Project Xanadu and hypertext laid the groundwork for a utopian vision, made manifest two decades later. Such is the trajectory we might imagine for New Media preservation. Philosophically, the archive provided the foundation for Paul Ricoeur's *Archives, Documents, Traces* (1978), for Giorgio Agamben's *The Archive and Testimony* (1989),[71] for Derrida's *Archive Fever* (1995) and for Hal Foster's *Archival Impulse* (2004). There is not absence of thoughtful commentary on how to best architect a memory machine since the encyclopedic theories of the Enlightenment. This interest in archives as a construct for memory store, for intellectual value and records management, maintains a disciplinary agnosticism if only because it implies an encyclopedic scope.

Relating this theory back to information practicality, the domain of information sciences also holds a steady position in relevant archival construction. Enter Paul Otlet (1868-1944), a librarian and information theorist perhaps best known for his work in piloting the ideology of the encyclopedia beyond utopian vision into practice. In Otlet's efforts, we might recognize how these archival impulses transformed from abstract utopia to real world possibility via technology. Such an anecdote contextualizes how new media and *technology-enabled* art provides a particularly promising framework for our future preservation programs.

In the 1920s, Otlet and colleague Henri La Fontaine began work in Brussels on the Mundaneum, or "worldmuseum," a collection of objects n documentation in a kind of living encyclopedia with planned accessibility via telephone.[72] As an inheritor of this theory and approach, Mike Judge worked for decades on the *Encyclopedia of World Problems and Human Potentials*, under the auspices of the Union of International Associations (UIA), a collection of groups with the stated mission of categorizing all human knowledge. With over 20,000 entries in

---

[71] Agamben defines the "archive" as "relations between the unsaid and the said." Interesting that the archive straddles the capacities of tacit human understanding, and is thus timeless and utopian in its very definition by Agamben's standards. Foucault's definition for the "archive relates to the positive dimension corresponding to the plane of enunciation." In either case, the archive is a utopia, a place difficult to conceive.

[72] Daniel Michaels, "Encyclopedia of World Problems Has a Big One of its Own: Chronicle of Woes From Alien Abductions to Dandruff Finds Itself Short." Online Wall Street Journal, (December 11, 2012) accessed December 28, 2012 http://online.wsj.com/article/SB10001424127887323717004578158742420230924.html.

the print version, this compendium eventually migrated to the web, then atrophied in the wake of search engines and complex relational graphs piloted by Google and the social networks of our current world. Still, the theory and approach to providing universal and federated search of information persists, one of the stated approaches on the archive's FAQ page reifies this imperative "It might be said that the intention of this collection of papers is progressively to elicit that ['non-simplistic mode of integration'] focus whilst avoiding premature closure. Some relatively primitive approaches to this challenge are reflected in a form of *mind map*. [emphasis mine]."[73] Like most archival initiatives, Judge's work was built on a self-stated "continuing concern with … approaches to synthesis, transdisciplinary and transcendence of polarized thinking in responding more strategically to the challenges of the times."[74]

What is significant about the entire lifecycle of the Mundaneum, and its successors in the search engines of our internet world, was the introduction of computers and mass computation that extended this initiative from obscurity to external interest. After 1972, the UIA began employing computation engines to perform analytics on the data collected, track, compile and compute. From there, whole relationships between institutions and religious groups, between motivations and money trails became apparent in assessing the output of research programs contributing to collective knowledge. Computers changed the landscape of the Encyclopedia, of the Mundaneum from antiquated archive to organic machine. Computers as engines of networked intelligence, both as medium of art production and medium of analysis and collection, therefore migrated the potential of archival initiative to a new plane of progress and relational possibility, one that risk plateau if ill-equipped to process new media. Conserving new media at this stage in history feeds on this imperative and pervasive archival trend in philosophical, historical, and practical precedent. The drive to understand our world and capture it fuels a program of archival impulse.

As such, we recognize an artistic and ubiquitious tendency to archive. The trend it not utopian, but quotidian. For *Collect the WWW.orld : the Artist as Archivist in the Internet Age* (exhibition at 319 Scholes, Brooklyn, NY 2011), curator Domenico Quaranta assembled artworks that demonstrate Hal Foster's "archival impulse" in contemporary media. Thus, the practice of archiving personal artwork among artists has become a recognizable constant in our contemporary mediated state. Likewise, the concept of reinforcing interactivity, involving the patron as participant in an artwork or installation remains a consistent part of artistic practice among New Media artists. In an account of the work *Sans titre/Untitled: The Video Installation*

[73] Anthony Judge "Laetus in Praesens: Frequently Asked Questions." Last modified February 19, 2012. Accessed March 10, 2013. http://www.laetusinpraesens.org/bio/faq_laet.php#A1
[74] Ibid.

as an Active Archive (2006), artist Jayce Salloum writes that, in interacting with the installation "viewer becomes part of the extended archive, collecting, preserving, sharing stories that could possibly disappear, and neglecting others that are disappearing. The archive is untitled, as memory is, as the accounts of the subjects who refuse to be reducible are."[75] But as the breadth of New Media art might suggest, and as the case studies in the following section will illustrate, the lone artist or occasional participant cannot hope to tackle New Media Art's preservation problem head-on. The necessary expansion of our encyclopedic art archive to accommodate post-media demands a breed of user-generated content cartographers to democratize and distribute the archival effort.

From the more general archival philosophies of various contributors, a focus on new media and art related to archives returns us to the commentary of Enzenberger, Brecht, Baudrillard and Ascott. Rather than emphasize this rather nebulous but positive network structure, Baudrillard fixates on interaction patterns that, while still theoretical in base, do make some suggestive recommendations for how one might reconsider new media vis-à-vis precedent. By focusing on the interactive quality, and potential for reciprocity in systems built on semio-linguistic relationships (producer - consumer relationships turned transmitter-message-receiver relationships), Baudrillard positions new media as the product of a conversation, where the role of interlocutors shifts.[76] In terms of conservation, these shifting roles might provide for more productive and collaborative models of preservation procedure. By harnessing the power of the network, of the artists (producer) turned user-archivist (consumer), we have hope to conserve a breadth of media that might otherwise wallow in atrophy and obsolescence under the sole stewardship of a single archivist-conservator. To pull from Roy Ascott's essay *Is there Love in the Telematic Embrace*, "Meaning is the product of interaction between the observer and the system, the content of which is in a state of flux, of endless change and transformation…"[77] A way to combat this flux while maintaining the integrity of an art object is to consider first the media, conserve and then assess the content as is evolves through migration, emulation, or subsequent edition.

***

To this end, our preface in media art theory and media history, lays the groundwork for an organic archive system built on the labyrinthine quixoticisms of library practice (from Borges

[75] Jayce Salloum, "Sans titre/Untitled: The Video Installation as an Active Archive Charles Merewether, Charles, ed. *The Archive: Documents in Contemporary Art*. Boston: MIT Press + Whitechapel Gallery, 2011.
[76] Baudrillard, Jean. "For a Critique of the Political Economy of the Sign." Trans. Charles Levin. The New Media Reader, 278-288. Noah Wardrup Fruin and Nick Montfort, eds. Cambridge, Mass: MIT Press, 2003. From the French "*Pour une critique de l'économie politique du signe*."
[77] Ascott, 241.

to Otlet to html), on the complexity of French structuralist theory and relational aesthetics, on the conception of a "meta-media" archive whose maintenance culls from the collective intelligence of our internet systems. Such an archive is the one that will develop to house (mass) meta-media in our future preservation programs.

In the conclusion of his essay on Cubism (1912), Guillaume Apollinaire wrote about opening up the avant-garde from solitary practice such that the "art and the people can be reconciled with each other," and such sentiment carries throughout the development of media arts, to the present day usage of open source community, and to the internet as a global publication venue. Following the avant-garde art movements of the twentieth century, New Media Art instantiated itself at the ebb and flow of technological revolutions. In its infancy, it saw the development of mechanical terminology applied for human interaction to computational algorithm, where the original "super computers," the women (and sometimes men) operating the manual switchboards of telecommunications became machines, where the loom pattern and the punch-card became the design pattern and the algorithm for instructing mechanized systems and automating our world [Fig. 7-9]. In appreciation of this rapid evolution over the past century, we might expect that our vocabulary for persistent access and preservation initiatives might take cues from its own technologies to craft solutions for the atrophy of digital artworks. Our investigation of the archive, of the evolution of computing in its utopian, labyrinthine, and entropic iterations, and finally of the version control of the social network as the new paradigm for archival practice demonstrates how we might come to tackle the preservation New Media Art.

These new media archival issues are therefore not beyond our competence to mediate, to mollify. While the abbreviated timeline of a new media piece might provoke panic, by echoing the rhizomatic network structure of these complex post-media pieces in our conservation teams, by leveraging crowd-sourced population and anti-disciplinary groups of "experts" across library, art, and scientific domains, by employing artists at the service of their own documentary initiatives, we stand to manage these issues and create the organic archives of our next generation of [epilogued] media art. Programs like the Digital Public Library of America as launched by author and internet academic Maria Popova, embrace this challenge to archive independent of any institutional imperative. At the same time, such initiatives acknowledge that the task of architecting such a resource implies a debt to the aforementioned archival efforts echoing back to the eighteenth century, as Robert Darnton explains in his commentary on the library's recent launch:

> The [Digital Public Library of America] represents the confluence of two currents that have shaped American civilization: utopianism and pragmatism…For all its futuristic

> technology, the DPLA harkens back to the eighteenth century. What could be more utopian than a project to make the cultural heritage of humanity available to all humans? What could be more pragmatic than the designing of a system to link up millions of megabytes and deliver them to readers in the form of easily accessible texts? Above all, the DPLA expresses an Enlightenment faith in the power of communication [Fig. 14]. [78]

Though not directed at New Media Art, the construction of an encyclopedic archive built on the free markup foundations and the distribution capacity of the internet absorbs in its scope of challenges as well as in its impressive historical precedent, the concerns associated with New Media preservation. With that in mind, the next chapter of this program assesses the ephemerality of New Media Art with an eye on teasing out key and common issues in New Media impermanence to illustrate finally how we might mitigate such situations by implementing a new archive.

[78] Robert Darnton, "Explore: commentary on the launching of the Digital Library of America." *Lore* (2012), http://exp.lore.com/post/47739765302/the-digital-public-library-of-america-represents.

.: CHAPTER III :.

PRESERVATION ISSUES FOR META-MEDIA ART: CASE STUDIES IN ARCHIVAL EPHEMERA

The following case studies (three in total) tackle amplified aspects of these challenges that iterate in all new media works. As this new media is arguably "post-media" for the purposes of this thesis, the emphasis on archival challenges departs from traditional complaints of technical media atrophy, and discusses more abstract themes that will be persistent challenges to preservation moving forward. In the following net.art, electronic music art, and bio art studies, each artist or collective will provide preservation pitfalls related to author anonymity, interactivity, and unpredictability, respectively.

To revisit the concept of immateriality discussed the previous section, it is worthwhile to note that the following works, three in total, all suffer from an epidemic impermanence, which makes their media particularly interesting case studies for future archives. As Roy Ascott's embrace essay suggests, "telematics culture…consists of a set of behaviors, ideas, media, values, and objectives that are significantly unlike those that have shaped society since the Enlightenment."[79] It is no coincidence that the Enlightenment period and its direct precedent in the 18th century saw the birth of Diderot's *Encyclopédie*, of formal attempts to build archives and collect aspects of the world for reference and research. An understanding of our current art climate would do well to adopt a similar impulse to archive and collect, if only to combat the immateriality of our current media.

Structurally, and simply, each case study represents an issue of fixation in New Media Art preservation followed by a title that incorporates whatever media or subgenre the artist in question prefers. As this is a post-media but nevertheless media-conscious effort, each section addresses an artists œuvre in tandem with a few key pieces that provide context for the primary preservation challenges of their meta-medium of choice. Each title crowns a brief listing of the artwork in question (**Subject**), the media implicated (**Media**), and the time-span of the work (**Timeline**).

---

[79] Roy Ascott, "Is there love in the telematic embrace?" *Computers and Art: Issues of Content. Art Journal* 49:3 (Fall, 2006): 241-247, *Art Full Text* (*H.W. Wilson*), EBSCOhost, accessed March 24, 2013.

:: AUTHORITY: IDENTITY AND COLLECTIVE CONSCIOUSNESS IN NET.ART ::

Subject: Mouchette.org
Media: HTML, Flash, Java, PHP, MySQL
Timeline: 1996-present

"…net.art had finally freed the artist from the tyranny of the museums and galleries. The artist was free! They now had direct online access to their audience with no middle-man! Victory!! The history of art would be forever changed."

- Cory Arcangel, *Everybody Else*, in *Digital Folklore*, 2009

"An artist? Yes, here is a tip: I heard that the only way to become an artist is to say that you are one. And then you can call "art" everything that you make…. Easy, he?"

- Mouchette.org

In the 1998 web-based video game *Trigger Happy* [Fig. 2], Thomson and Craighead question New Media artworks as the products of individual artistic agency. On a black and white screen, populated by the pixelated abstractions of a geometric landscape, they write "The coming into being of the notion of "author" constitutes the privileged moment of individualization in the history of ideas, knowledge, literature, philosophy, and the sciences. Even today, when we reconstruct the history of a concept, such categories seem relatively weak."[80]

Culled from an unindexed and infinite cyberscape, net.art emerged as a body of art projects into a soup of collective authorship, constructed and deployed for the 1990s world wide web. Often associated with a dated but archetypal interface that maintains the aesthetic of this period, pieces contribute to what Joachim Blank refers to as the "Internet myth," or the "result of a massive self-referentiality of our media landscape."[81] Further, as Blank maintains, collaboration, as in this case study, becomes implicit:

> Net.art functions only on the net and picks out the net or the "netmyth" as a theme. It often deals with structural concepts: A group or an individual designs a system that can be expanded by other people. Along with that is the idea that the collaboration of a number of people will become the condition for the development of an overall system. Net.art projects without the participation of external persons are perhaps interesting concepts, but they do not manifest themselves as a collective creativity in the net.[82]

Likewise, in the conception of net.art developed by Steve Dietz for his 1998 contribution to the Museums and the Web Conference, much of net.art might be summed as a replacement for the "video" medium in our contemporary culture, and perhaps "a class apart"

[80] Mark Tribe, and Reena Jana, Uta Grosenick, eds, *New media art* (Köln: Taschen, 2003): 8.
[81] Joachim Blank, "What is Netart ;-) ?" Presentation at the exhibition *(History of) Mailart in Eastern Europe* in the Staatlihes Museum, Schwerin, Germany, 1996, accessed on March 15, 2013, at http://www.irational.org/cern/netart.txt.
[82] Ibid, 2.

from "ARTIST'S NET ACTIVITY."[83] From these, among other definitions, a picture of artists' activity on the internet in a sometimes collaborative, sometimes self-referential mode, populates as a simplified definition of the artwork discussed in this case study.

In the realm of new media art, defining an artist as an autonomous entity, uninfluenced, uninspired and unaffected by the interference of others, prompts questions of artistic authority and ownership in often participatory and inherently collaborative contexts. Such is the case for Mouchette.org (1996-Present): a website that employs HTML, flash, Java, PHP and MySQL technologies to create the heavily hyperlinked profile of a young girl named "Mouchette," who lives in "Amsterdam," self-identifies as an "artist," and is (for now and forever) "nearly 13 year-old."[84] Loosely based on Robert Bresson's 1967 French film, *Mouchette* (meaning "little fly" in French) and by extension Georges Bernanos' 1937 book, Mouchette.org presents visitors with a provocative visual-virtual interface, laden with tragic themes of suicide, death, and pedophilia, and layering media in a manner that is as *modest* in its sophistication as it is paradoxically *provocative* in its suggestive content. At the origin of this web persona, who for years profited from a complex interweb artifice protecting her identity, Martine Neddam emerges as not only the originator of the Mouchette site, but also the creator of two other web personalities and a body of distinct installation and performance art spanning over two decades and several geographic locales. Equipped with a background in linguistic theory and multimedia art-making, Martine Neddam merges with Mouchette. As avatar and author, they create a net persona that until recently was largely anonymous, and even now remains vaguely ambiguous. Provocative and pullulating since its 1996 inception, Mouchette.org exemplifies the new media art aesthetic, challenging paradigms of individual personality and artistic precedent while knitting a network of html-based philosophy and interactive artistry for the 21st century and beyond [Fig. 16-18].

Perhaps most relevant to this thesis, Mouchette engages with a few archetypal issues in media art, notably a question of authorship which complicates cataloguing and questions of persistent hosting and link rot which complications preservation. More than ten years old, the site's persistence as a net.art project relies upon the technical ability and dedication of its artist for archival purposes. The implied participation of the site visitor in the project's personae process requires further that the site dynamically accept inputs, that it continuously respond to new content, that it further evolve with the coeval evolution of the internet as a hosting and

---

[83] Steve Dietz, "beyond.interface: net art and Art on the Net II," A paper presented for the *Museums and the Web Conference 1998*, accessed March 29, 2012. http://www.walkerart.org/archive/5/B6739D30749AE5106165.htm?&src1=../D/BD739D0875D453566164.htm&target1=right

[84] Martine Neddam, "Martine Neddam, artist: CV Projects and Exhibitions." *http://www.neddam.info* accessed 20 Oct. 2010.

publication platform. As such, Mouchette's dynamic persona requires a maintenance and hosting solution for preservation that might apply to many net.art pieces but surely presents universal themes relevant to internet conservation as a subgenre of New Media Art preservation. How might we proceed with preservation when the platform for production lies outside our ultimate control?

A further dive into the piece itself provides an instructive perspective on its scope and complex cycle of input/output. After even cursory exploration of the site, a common sense comprehension of net_art programming and the explicitly sexual and violent nature of the content makes the authorship of a 13 yr-old at best, unlikely, and at worst, offensive. In alluding to the Bresson film through a shared name and some imagery, Mouchette.org recalls the tragic story of a French teen subjected to sexual and emotional violence before submitting to suicidal impulse. However, unlike the film or book before it, Mouchette.org engages visitors directly in a synthesthaesic multimedia 'choose your own adventure,' where he/she can hear the plaintive wimperings of the presumed Mouchette against a floral visual backdrop, overwritten only by a small thumbnail image of a young girl, and her limited bio:

> My name is Mouchette.
> I live in Amsterdam
> I am nearly 13 years old
> I am an artist
> Le site existe aussi en Français
> My next mood is…(reload).

All of the above text contains embedded hyperlinks to additional pages created by the artist and her fan base; and still other pages remain accessible in a drop down menu suggestively entitled "browse me." Such browsing leads visitors to cryptic messages about the artist's fabricated identity, q&a threads about suicide and interactive web forms that probe the personal details of viewers all-the-while maintaining author anonymity. Participatory content ranges from the seemingly innocuous fill-in form for joining the Mouchette fan club, to the borderline pornographic photo of a young girl's tongue licking the screen coupled with text asking:

> Finally, I can come that close to you
> Do you also want to come that close to me? Yes___. No___.
> Want to know what my tongue tastes like?
> Try it on your screen and tell me._____.
> Name_____.
> Email_____.

Responses to any one of the many forms available make users reciprocally vulnerable to delayed-reaction emails, flirtatious "coucous" from Mouchette a few weeks or months after their initial subscription.[85] In any case, Mouchette.org not only tickles the fetishistic side of its visitors but also invites them to directly contribute to and participate in a complex web narrative, crafting a compelling and collaborative art piece linked to myriad artworks in a multilingual *mise-en-abîme*.[86]

Behind this and several other anonymous internet personae, Martine Neddam represents a likely candidate for the true "*artiste*" in question. As of 2008-2009, Neddam revealed herself as the author of Mouchette in an interview with a private French arts magazine, *Item*, and through correspondence with Paule Makrous, Thus, the bilingual net.art of mouchette.org actually stems from the creative production and editing prowess of a French artist and professor, living and working in Amsterdam. With a background in linguistics and French literature from the Université de Lyon, Neddam completed her education at Architectural School as well as at the *Institut des Hautes Études en Ars Plastiques* in Paris.[87] Perhaps the most puzzling part of her identity is its essentially dubious nature; her proficiency in the creation of internet personalities (from Mouchette to David Still and Xiao Quian, two other net_art identities fabricated by Neddam) renders all internet information about her subject to question and confusion. Such is the artist's intention. Throughout her interview with Paule Makrous, Neddam admits and interest in using textual (and hyper*textual*) innovation to facilitate communication and circulation of identities that remain "*complètement labrinthique.*"[88] Informed by diverse aspects of her education, her philosophy of art-making represents the composite of her ongoing aesthetic project to blend text-based linguistics, with the architectural aspects of performative stage design, and the collaborative facets of web design on a graphical user interface.

Though Mouchette remains a main project in her œuvre, Neddam's performative art history includes installations and exhibitions with an international scope as of the late-1980s. For example, her 1992 solo exhibition "*Marche sur Moi*" or "Walk on me," installed in the cupola of the Municipal Museum in Arnhem, invites visitors to walk over and listen to written an spoken word art, attempting to engage them physically in a provocative and performative dialogue with the surrounding space.[89] Likewise, her public commission for the Roermond District Court House

---

[85] Mark Tribe, and Reena Jana, Uta Grosenick, eds, *New media art* (Köln: Taschen, 2003) 66.
[86] Annick Bureaud, "Mouchette." *Art Press* (May 2000): 90, *Art Full Text*. accessed 20 Oct. 2010, 1.
[87] Martine Neddam, "Martine Neddam, artist: CV Projects and Exhibitions." *http://www.neddam.info* accessed 20 Oct. 2010.
[88] Paule Makrous, "Le partage sur le Web : personnages virtuels et Web 2.0 selon Martine Neddam /Web sharing: virtual personae and Web 2.0 according to Martine Neddam" .dpi, Revue électronique du StudioXX, Montréal, Canada. accessed 20 Oct. 2010, 5.
[89] Neddam, "CV Projects and Exhibitions."

entitled "Il n'ya pas de droits d'auteur sur les lois" or "There is no copyright ("rights of the *author*") on legislation" confronts viewers with an assortment of legal jargon projected and shadowed on the court house walls, once again inviting visitors into a performative space where interpretations of textual meaning are staged and solicited from legal sources and spectators alike. Since 1996, Neddam has created several virtual personalities with "autonomous artistic identities," including David Still (2001) and Xian Quian (2006), websites that she makes more an more participatory and public with the passage of time.[90] Current projects further echo this initiative, as Neddam continues to develop her *virtualperson.net* site which offers visitors the opportunity to integrate image and text in the creation of his/her own internet identity.[91] All of the above contribute actively to Neddam's internet art œuvre, including mouchette.org, whose filmic namesake underwent a copyright battle of its own with the Bresson estate, resulting in the forced deletion of all 1967 *Mouchette* imagery from Neddam's website.[92]

Of late, Neddem crafts her mouchette manifesto according to an attempt to reconcile her artistic background with contemporary and collaborative trends in the creation of internet avatars. Her artistic objective, while undefined upon creating Mouchette.org, continues to develop as "a mixture of text and image in visual composition" where "the unexpected [is] very important in the site [framework]…because it has this confusing navigation and it is based on playfulness and surprise."[93] Neddam's extensive exhibition history supports this platform of original yet collaborative art-making with a base in textual wordplay and the creation of unexpected and provocative public spaces. In addition to several late-90s solo shows now archived on the Rhizome ArtBase, such as 1998's "Digital Flesh and Blood," Neddam as "Mouchette" participated in Amsterdam's De Kunstylaai *Net Affects* (April 2000), Utrecht's *Inside Out* Impakt Festival (2000), Montreal's *Nouveau cinema, Nouveaux medias* festival (Oct. 2000) as well as the New Museum's 2000 "Trust me" exhibit and 2009 Rhizome "Splashback" pages (1998-2002). To preserve such ephemeral net-based works, Neddam maintains web archives of her net_art content as well as all internet correspondence exchanged with fans and site contributors.[94] Furthermore, a complete exhibition history and list of major publications featuring Mouchette.org remains available via Mouchette's CV. Even so, Neddam admits that the maintenance of much of her

---

[90] Makrous, "Le partage sur le Web : personnages virtuels et Web 2.0 selon Martine Neddam /Web sharing: virtual personae and Web 2.0 according to Martine Neddam," 6.
[91] Annet Dekker, "In Search of the Unexpected." Navigating e-Cultures. *Interview with Martine Neddam*. Virtueel Platform. Amsterdam, Netherlands (2009), 71-72.
[92] Ibid. "Le partage sur le Web : personnages virtuels et Web 2.0 selon Martine Neddam /Web sharing: virtual personae and Web 2.0 according to Martine Neddam" .dpi, Revue électronique du StudioXX, Montréal, Canada, accessed 20 Oct. 2010, 1.
[93] Dekker, 68-69.
[94] Makrous, *Le partag*e, 3.

net_art becomes more and more time-consuming and tedious with the passage of time: "compatibility has always bee none of the main issues of the Net…[o]ne year ago [2008], I stopped creating new works for Mouchette but I am still working 10-15 hours a week to keep It alive, maintaining domains, re-registering etc. If nothing happened the art would die."[95] Just as the suicide themes embedded in the site's text and the image of the ever-present "little fly" (or mouchette) suggest human mortality from screen to hyperlinked screen, so too the mechanics of Mouchette.org's operation reflect a kind of impulse to virtual suicide counteracted only by the most assiduous efforts of its author, and the active participation of its contributing visitors.

From a historical perspective, Mouchette.org's participatory and link-based interface relates to hypertextual conceptions as early as Borges' fictional forking paths and as recent as any internet based questionnaire or membership account requiring a login and pin. Likewise, Mouchette.org's association with an anonymous female web personality links her to various peer-precedent in the art world including Lynn Herschmann-Leeson's *Lorna* and Joseph Wiesenbaums 1960s "chatterbox," *Eliza*. Not unlike Cindy Sherman and her *Untitled Film Stills*, Neddam and *Mouchette* inspire discussions of authority and authorship in unabashed appropriation of others' artistic efforts (in *Mouchette*'s case, that of the participating web visitors and of Bressen's film conception).[96] Likewise, Neddam's desire to offer up "the use of … that digital soul of mine, to hundreds of Internet users…full of surprises and unexpected connections…in the shape of a *labyrinth*" recalls Ted Nelson and Ned Woodman's "Labyrinth" hypertext system as exhibited at Jack Burnhams' 1970 *Software* show.[97] Paralleling Olia Lialina's *My Boyfriend Came Back from the War* (1996) and Nick Crow's *Discrete Packets* (2000), Mouchette.org aligns herself with contemporary net_art narratives and the creation of false internet personaes through Neddam's editing efforts.[98] Like Darcey Steinke, whose background in publishing nourishes the romantic narratives that she currently creates in hypertext, so too Neddam's linguistic training informs her attempts to fuse text and image through the net medium.

In relation to contemporary art theory, Neddam's *Mouchette.org* fulfills categories of new media art in its essentially *procedural* and *participatory* structure, in its *encyclopedic* linking potential and in its representation of performative virtual *space* as prescribed by its author and as facilitated by its visitors.[99] In her attempt to create a personable identity out of 2-D hypertexted

---

[95] Dekker, 73.
[96] Tribe, 66.
[97] Manthos Santorineos and Toni Sant. "Rape, Murder and Suicide Are Easier When You Use a Keybouard Shortcut: Mouchette, and On-Line Virtual Character," *Leonardo* 38.3 (2005), 206, 221, *Art Full Text*, accessed 20. Oct. 2010.
[98] Christiane Paul, "Chapter 2: Digital technologies as medium" in *Digital Art.* London: Thames and Hudson, 2008, 109-112.
[99] Janet Murray, "Inventing the Medium," Introduction to *The New Media Reader*, Noah Wardrup Fruin and Nick Montfort, eds. (Cambridge, Mass: MIT Press, 2003), 6.

digital design, Neddam creates an interface not unlike the transpublication or transclusion web connections suggested in Theodore Nelson's *Xanadu*, wherein users may navigate hyperlinks and circle back or forward though references depending on impulse. By soliciting communication with her website's visitors, Neddam further prompts a discussion of "art as residing in a cultural communications system rather than in the art object as a fixed semantic configuration;" Mouchette presents a digital "system in which the viewer actively negotiates for meaning" through the navigation of a hyperlinked web-world.[100] Recent developments in Mouchette's configuration only further this connection to Roy Ascott's telematic[101] culture, for in an increasingly collaborative effort, Mouchette.org now asks for visitors to sign-in and become Mouchette, thus fusing their contributions with her artistic identity:

> Now it's your turn to become Mouchette...
> Or maybe you don't know how to do it?
> Become Mouchette!
> A unique opportunity to become a great artist!
> Send email from mouchette@mouchette.org!
> Create true Mouchette web pages!

Ultimately, net.art as a body of work presents many challenges to preservation: technicalities of linkrot, domain rehosting, maintenance, upgrade, and browser display issues. Further, net art experiments with online identities have developed into an aesthetic of internet archive: from the pedestrian content-chive of the blogosphere, to the developed collections of the www.world. UGC archives like Jonathan Harris' We Feel Fine (http://www.wefeelfine.org/) project or Cowbird (http://cowbird.com/), which both function as user generated catalogs of human emotion and "witnesses to life," building on the principle that the future of preservation architects in the hacked-together pages of rogue internauts, fabricating the internet in an amateur's architecture without pre-determined index [Fig 23]. In abiding by this construction, and contributing to this system, we demand a new form and forum for collaborative conservation that will allow us to collect the world (http://collectheworld.tumblr.com/), and otherwise become the retronauts (http://www.retronaut.com) of our own technostalgic dives into net.art archives.[102] We likewise invite artists to build their own collaborative and crowdsourced art archives like

---

[100] Roy Ascott, "Is there love in the telematic embrace?" *Computers and Art: Issues of Content. Art Journal* 49:3 (Fall, 2006): 241, *Art Full Text* (*H.W. Wilson*), EBSCOhost, accessed March 24, 2013.

[101] Furthermore, it seems useful to note in the context of a french based new media artist, that the idea of "télématique" originated from the Simon Nora and Alain Minc text *L'Informatisation de la société* (Paris: La Documentation Française, 1978), 2.

[102] By way of introducing a few links to amateur projects the function as archival catalogues, this paragraph includes a few URLs that echo the sentence structure of the paragraph. This is deliberate, if a bit silly in its contrived reference to Tim Berners Lee's idea of the hyperlink (and how, in the original conception, every work might provide a two/multi-way linkage to another resources of relevant).

Koblin's Exquisite Forest (http://www.exquisiteforest.com/), a contemporary exquisite corpse-chive architected in code [Fig. 24].

The requisite participatory nature of Mouchette's internet identity echoes the "total embrace" that Roy Ascott treats in this 1990 response to the participatory universe of telematics media art, where "[b]y participating in the embrace, the viewer comes to be a progenitor of the semantic issue…networking interaction in a field of uncertainty."[103] Throughout his essay, Ascott alludes to the kind of solicitation via viewer collaboration in the works of abstract expressionist artists like Jackson Pollock, whose "imagery carries a sense of anonymity of authorship that embraces the viewer in the creation of meaning."[104] This effectively articulates abstraction in the lineage of New Media Art development, "prophetic of the network consciousness emerging with… telematic culture." In line with Ascott's idea of "dispersed authorship," Mouchette increasingly out-sources ownership and authority, such that "[c]reativity is shared, authorship is distributed.[105] Through a dynamic platform of author ambiguity and user participation, Mouchette fosters a virtual environment where "the polarities of maker and user become destabilized" (245). In so doing, she announces herself as an essential element on the path to technological proliferation and progress through new media art, wherein "the decentered and decentering quality of hypertext has become the subject (and method) of a growing critical post-structuralist literature, and arguably a central icon of post-modernity."[106]

To suggest then, that net.art works present radically different participatory interfaces that previous art periods, is to neglect the participatory expectation of precedent and performance art. What is different in this case, is the labyrinthine extent of networked collaboration enabled by the internet. Such work requires more than one painting conservator tending to the friable flux of pigmented splatter patterns; such work requires the networked efforts of an army of attendants. If echoes of an artwork iterate throughout internet oblivion, then a preservation program of almost equally infinite participants must respond to maintain it.

Indeed, Michael Fried's *Absorbtion and Theatricality: Painting and the Beholder in the Age of Diderot* (1980) calls upon a similar participatory quality shared between audience and actors in a performance and in art throughout the eighteenth century. This remains a significant echo not because the Mouchette implies a necessarily performative relationship between the beholder and the artist, but because the codification of the encyclopedia roughly contemporary with Diderotian philosophy forms a foundation for how we approach archival collection post-

[103] Roy Ascott, "Is there love in the telematic embrace? *Computers and Art: Issues of Content, Art Journal* 49:3 (Fall, 2006): 242. *Art Full Text* (*H.W. Wilson*), EBSCOhost, accessed March 24, 2013.
[104] Ibid., 242-3.
[105] Ibid., 245.
[106] Edward Shanken, Edward (ed.), *Art and Electronic Media* (New York: Phaidon, 2009), 2.

media. Our new encyclopedic systems for hosting and documenting net.artworks will necessarily respond to this tension between audience and artist but on a greater scale.

Perhaps Mouchette's significance as an enduring example of (old) new media art exists in the message her medium conveys. By prompting visitors to poke about the Mouchette internet persona, Neddam provokes questions of semantics and semiotics: of what we mean by internet "user" when we relate the used to a 13 year-old girl. How do we define the delicate limits of innocent web "browsing" when it probes the promiscuous and provocative hyper-personal hyperlinks of a potentially prepubescent young female. How can we judge critically the work of an inherently ambiguous artist? How can't we? Mouchette prompts us to interrogate and engage with the media as much as the message it conveys, she provokes an awareness of our "typographic cultural bias, [wherein] our testers assume that uniform and continuous habits are a sign of intelligence" by constantly refreshing and destabilizing our ideas of ration and procedural thought progression.[107] Mouchette leaps her way through lily-pad digital touchstones that border on random and rely on input from outside internet users.

While referencing issues of responsibility in the context of a continuously renewable new medium, *Mouchette.org* blends an encoded discourse designed by Martine Neddam as artist with a series of spin-off sites as created by her growing fan base. By engaging with hyperlinked experimentation, user participation and textual provocation, *Mouchette.org* exists as the manifestation of myriad controlled extremes: both provocative and poignant, emotive and personal and yet grounded in a dispassionate programmed framework. Ultimately, Martine Neddam as *Mouchette* straddles and blurs a precarious boundary between digital and human interactivity, while calling into question our preconceptions about what constitutes appropriateness, authorship, and art within the ever-extensible realm of new media net.

Though representative of a singular capture in the media art landscape, Mouchette.org brings up issues of authority that iterate as ethical and practical concerns for preservation across post-media art types. Artists like Mark Napier acknowledge this, and his works *Landfill* (1998) and *Feed* (2001) quote to the same period as Mouchette's play with HTML, Javascript and the web-wide world, both involve the same "media" constituents though the output and objective of each remains distinct. No matter, in terms of post-media preservation, the theoretical challenge remains the same. In his artist statement, Napier writes that "[m]y works are not objects but interfaces. The users become collaborators in the artwork, upsetting the conventions of ownership

[107] Marshall McLuhan, "The medium is the message" from *Understanding media: The extensions of man* (New York: McGraw Hill, 1964), 207.

and authority…[b]y interacting with the work, the visitors shape the piece."[108] Active solicitation of user feedback and participation reads as a weakness to cataloguing initiatives where the traditional fields of "author" and "scope of work" are skewed, but this might also be interpreted as an advantage. If the net.artwork implies participation that it is not unreasonable that it's archiving and rehosting might be mined out to other parties. Thus, the paradigm of the collaborative archive fed by user generated content and documentation submissions might represent the best hope we have for such works ushering toward obsolescence in the face of link rot and domain re:hosting and long term persistence of ARTIST'S NET ACTIVITY.

:: INTERACTIVITY: RANDOMNESS AND NOISE IN REMIXED ELECTRONIC ART ::

Subject: Sound Installations of Ryoji Ikeda
Media: algorithms, electronic audio, source code and computer hardware, sensor networks
Timeline: 1993-present

"Music is the pleasure the human soul experiences from counting without being aware that it is counting."

- Gottfried Wilhelm von Leibniz, 1646-1716

" To me, beauty is crystal: rationality, precision, simplicity, elegance, delicacy. The sublime is infinity, infinitesimal, immensity, indescribably, ineffable"

- Ryoji Ikeda[109]

"An algorithm that allows the creation of random values is called a "random generator"…the two most important random generators, randomness and noise…"

- Bohnacker, Groß, Laub and Lazzeroni, *Generative Design*, 2013

In section M.1.0 of their instructional compendium *Generative Design*, Bohnacker, Groß, Laub and Lazzeroni discuss the delicate distinction between random() and noise(). Both functions in the programming language *Processing*, that is, both are instructions that educate a computer on a particular action. Random and Noise merit distinction as they are two independent modes of operation, producing independent visual results. Our typical semantic associations with "randomness" predispose us to consider its output to be arbitrary, in computer science however, "determinism" (the necessary situation where sequences of values are determined by an initial and fixed condition) precludes this re application of the same denotation to "random." Random and Noise functions produce different results, where "random…is not a panacea for a weak visual composition…[rather] random processes are indispensible tools that can be used to break up the

[108] Mark Tribe, Reena Jana, and Uta Grosenick, eds., *New media art*, (Köln: Taschen, 2003): 70.
[109] Ikeda as quoted by Christopher Olson, *Beautiful, useless things: the work of Ryoji Ikeda*, 2010, 57-58.

extreme and sometimes rigid regularity of computer-generated work," but they are a fabricated and pre-determined product of calculation and deliberate parametric.[110]

Within this discussion of random and potentially radical "noise" art, the work of Ryoji Ikeda presents compilation of multimedia music types that incorporate mathematical algorithms, sensor networks and complex code to inform interactive installations. For preservation of such complex and often participator work, issues of multiple media types to catalog as well as fugitive formats for audio and software storage present themselves in tandem with the essential mutability of works whose installation depends on user participation. Like the work of Martine Neddam for *Mouchette.org*, Ikeda's work requires interactivity, and complicates capture for archival purpose in this among other respects [Fig. 19-22].

Much has been made of the parallels between musical composition and mathematical computation. German author, Gœthe asserted that architecture, with all its fundamental geometries, was not unlike frozen music; while German physicist, Hermann von Helmholtz related mathematics and music in their mutual quality as "the unconscious expressions of a mysteriously acting rationality."[111] Unconscious or otherwise, the conflation of both disciplines coordinates with their mutual use of *counting* as a component of communication, with notes and numbers as their respective semiotic nodes. [112] In the spirit of this mélange, Ryoji Ikeda mingles math and music by manipulating (new) media.

Known most for his prolific production as an electronic music composer, subsequent Ikeda projects and performances incorporate increasingly math-based and interactive installations. Achieved through the coordination of computer systems and collaboration with contemporaries, Ikeda's œuvre comprises a variety of conceptual projects with multiple manifestations and iterations, projects that actively negotiate an audio-visual binary across disciplinary and geographic boundaries. Evermore epic and profound, Ikeda views his performances and installations and dually informative of scientific and artistic theory, and his intentions for the future continue to amalgamate artistic, auditory and algorithmic experiences throughout a variety of international venues. From an assessment of Ikeda's projects and precedent in the new media art world, the profile of a peculiar artistic identity emerges, one who actively using music and media to explore infinite possibility and perception while blurring compositional complexity with absolutist dichotomy.

---

[110] Claudius Lazzeroni, ed, *Generative Design: Visualize, Program, and Create with Processing* by Hartmut Bohnacker, Benedikt Groß, and Julia Laub (New York: Princeton Architectural Press, 2012): 322-345.
[111] Hermann von Helmholtz, *Vorträge und Reden*, (Bd. 1. Braunschweig: F. Vieweg, 1884), 82.
[112] Interestingly, Ikeda's music releases from Raster-Noton, a *German*-based record label; historically, *German* theory and cinema has proved particularly proactive in blending music and mathematic and in producing visual abstractions of musical movements and rhythms. Coincidence? Probably, but still…

Born in 1966 Japan, Ryoji Ikeda currently lives and works in multiple mobile locales, principally in Paris and New York.[113] Without particular technical training or educational background, he began his career as an electronic sound artist and experimental composer in 1995, creating independent pieces while also teaching art at various Tokyo universities and curating small exhibitions throughout the late 1990s.[114] In the early 2000s he began more international collaborative projects with the likes of performance artists like Dumb Type and sonic artist Carsten Nicolai. In an effort to retain anonymity as an artist, Ikeda "almost never appears onstage" and eschews interviews lest he compound the complexity of his mathematical motives by glibly expounding on his ideological influences.[115] Even the artist's website and literature reflects a humble minimalism where "little information is given beyond venue schematics and the technical data of previous installations and performances.[116] Gradually, his electronic compositions gave way to a collaborative and interactive new media, combining his exploration of sine curves and sonic beats with the participatory platform of his large scale light installations. With a focus on minimalist aesthetics and sharp contradictions: black/white walls; sterile electronics/subtle illumination, clean lines/cacophonous frequencies, Ikeda immerses visitors in an artificial reality within which he aims to provoke contemplation: of infinity, of synaesthesic sublime, of philosophy without the trappings of theory or a need for translation. Focusing on frequencies and ultrasonics in his musical compositions, he combines mathematical concepts and computer technologies to craft unique performances fueled by an ultra-minimalist aesthetic.

In keeping with Janet Murray's fundamental facets of "new media" art, Ikeda's work plays with *procedural* and *participatory* dynamics while presenting an *encyclopedic* conception of mathematical infinity represented on *spatial* and audio platforms. Far from a Luddite, Ikeda embraces technology, even fetishizes and exploits the limits of its aesthetic and auditory appeal.[117] Though his collaborative efforts allow him to dabble in mathematical and theoretical complexity, his work remains bound to minimalistic and technical simplicity, a paradox which defines his œuvre.

With the investigation of math and technology as the motivation for his music making, Ikeda builds a philosophy on the idea of the amalgam, the collaborative, and the culturally ambiguous. His work draws from a kaleidoscope of seeming contradictions: the metaphor of the

---

[113] Martin Herbert, "The Mathematical Sublime," *Modern Painters* 20.9 (2008), 83.
[114] Nakane Kazuku, "Ryoji Ikeda Museum of Contemporary Art, Tokyo" *Sculpture* 29.1 (2010): 76.
[115] Herbert, 83; also, Christopher Olson, "Beautiful, useless things: the work of Ryoji Ikeda" *Border Crossings* 29.1 (2010), 59-60.
[116] Ibid., 60.
[117] Yuko Hasegawa, "Ryoji Ikeda." *Sensorium: embodied experience, technology, and contemporary art*, Caroline A Jones, ed, (Cambridge, Mass.: The MIT Visual Arts Center, 2006), 69.

Cartesian crystal and mathematical precision, as well as the extremes of audible frequency, the chaos of random and real-time coding.

Ever-evolving and open to reinvention, Ikeda experiments with a range of media messages, including performances, recordings, audio-visual installations, sound/light exhibitions, and musical compositions. Evident not only in his prolific production of electronica and graphical computation installations but also in his collaborations with experts in other disciplines (his work with Toyo Ito, Japanese architect, and with Harvard mathematician Benedict Gross), the multimedia and multiuser interface inherent in Ikeda's œuvre defines his varied pieces by a unified investigation of infinite possibility, applied to mathematics, aesthetics, and music. Musical ideas combine with simplified binary dichotomies to create space for the sublime and the infinite, which, if it reads as obscure, is only so because his limited literature documenting each installation reiterates the same utopian math-speak of abstraction. Even so, Ikeda's work provides unique and interdisciplinary platforms from which to explore complex concepts on a simplistic and accessible interface.

Often likened to a mathematician, Ikeda "distills everything to a temporal level before he goes on to compose his work;" he enjoys the exercise of "bring[ing] music as close as possible to the status of data," and in this interpellation he succeeds.[118] Unabashed about his collusion with outside programmers and engineers to achieve his desired aesthetics, Ikeda admits that to apprehend greater conceptions of the 'infinite' and the 'sublime,' such interdisciplinary interface remains key to "*bâtir un solide dialogue conceptuel*," or to build a solid conceptual dialogue.[119] Ever humble, he considers himself a "*compositeur*" rather than a computational genius, but he concedes that one must approach mathematics to give structure to musical work[120] However complicated his work might seem, he produces performances with only the most modest and minimalistic intentions in mind: stating "[i]t sounds a bit pretentious to represent the sublime, but I want to think, at least, about how we can experience a tiny bit of it."[121] Above all, Ikeda remains a collaborator: bent on bolstering his own self-made-man aesthetics with the informed perspective of mathematical and music makers across the globe. In this 10 year effort, he seems already accomplished, with his musical installations distilling (appropriately) to a series of "m"s: multimedia, mathematics, minimalism, and multiplicity.

---

[118] Hasegawa, 69; Herbert, 83.
[119] Anne Picq, "Ryoji Ikeda & Benedict Gross: Art & mathématiques, à la frontière du connu," *Beaux Arts* Magazine 292 (2008), 92.
[120] Ikeda quotation, translation mine: "Je suis compositeur…je devrais me rapprocher des mathématiques pour donner à mon travail une structure." See Anne Picq, Anne. "Ryoji Ikeda & Benedict Gross: Art & mathématiques, à la frontière du connu." *Beaux Arts* Magazine 292 (2008), 93.
[121] Ikeda as quoted in Herbert, 84.

As prolific as he is productive, Ikeda's most active period of new media making (spanning 2000-2010) illustrates a combination of musical compositions, recordings, installations, concerts and publications organized around approximately nine main project conceptions. Guided by his "microscopic methods" of sonic composition, he continues to produce albums with regularity including: +/- (1996), *0 degrees* (1998), *Matrix* (2000), *op.* (2002), *dataplex* (2005), and *test pattern* (2008) (Tokuyama). However, his œuvre extends far beyond his musical propensities. In 2001, he began *Spectra*, his project that manipulates large scale night spotlight projections like sculptural matter illuminating the skyline of a cityscape. Composed of white light projectors, including all of the colors of the *spect*rum, the installation bathes viewers in "invisible" color, "with its attention to contingencies of site…[accepting] the logistical necessity to work with a lot of strangers."[122] Accompanied by a soundtrack of sine waves, the installation permits viewers to weave in an out of up-lighting lamps, subtly changing the symphony of sound while immersing themselves in the spectral space. Multiple iterations of this installation exist, including spectra [Amsterdam], followed famously by the spectra *Nuit Blanche* in Paris, where a grid of 64 floodlights illuminated the Paris skyline during a 12 hour long performance. Aside from the essential interactivity of this installation, the ephemerality of the performance "play[s] a backhanded conceptual role in salvaging Spectra [Paris] from the realm of sedate monumentality."[123]

Likewise interdisciplinary and ephemeral, *Test pattern* (2008-2010), a performance piece syncing projected imagery to a soundtrack, creates an interactive audiovisual installation where data (text, sound waves, films) are reductively converted into barcode binary patterns (1s and 0s) and projected on large scale screens. This creates an immersive experience where nighttime viewer-participants are illuminated by bright and booming blacks and whites, coupled with frequencies composed in real-time by several computers through a software algorithm collaboratively created by Ikeda and others. Fascinated by the ideology of the "binary scenario," Ikeda attempts to apprehend, through a translation of sound and image into code, the infinite possibility available between 0 and 1. [124] Juxtaposing black/white, sound/silence, calculation/composition, his work investigates absolutes and exclusivity, and thereby arrives at an amalgam: affecting the ingenious and the infinite from the sublime and the severe.

Recent exhibitions continue on this theoretical platform. Spectral light exhibited at Sónar in 2010, exemplifying Ikeda's quality as a multi-and new media artist by incorporating math-based

[122] Herbert, 84.
[123] Michael Polsinelli, "Ryoji Ikeda," *Flash Art* (International Edition) 41 (2008), 88.
[124] Karine Tissot, "Ryoji Ikeda: +/– (The Infinite Between 0 and 1)," *Art Review* (London, England) 33 (Summer 2009), 149.

spectral calculations into an essentially musical installation. This particular performance employed real-time alteations of his musical frequency compositions accompanied by the requisite light show: inviting viewers to listen to the electronic tings and twinges, look at the light, and otherwise lounge about the Teatre Grec while watching darkness disappear amidst powerful illumination.[125] Likewise, *Test pattern* found partial reiteration in a recent exhibition at the French Institute/Alliance Française (Fall 2010): coupling "the transcendental," a V≠L gallery installation, and "datamatics[ver. 2.0]," an audiovisual concert. Based on Ikeda's collaboration with Harvard mathematician Benedict Gross, V≠L studies the paradoxes of the infinite as expressed in mathematical numerals. The variable V and L represent aspects of universal understanding whose equality and inequality remain dubious. Inequality in this case permits an incorporation of numerals outside our own conception of reality, thus permitting theorists to hypothesize about the infinite. Together, both Ikeda and Gross created a real-time computer program that generates a transcendental number (mathematically infinite), and displays it on an ever-updating computer screen installed in a stark white room. Each visitor experiences a different iteration of the "infinite" as he or she approaches the screen on continuous algorithmic, serenaded by the subtle but high-pitched frequency perceived differently depending on the participant's personal geography.

As precedent to Ikeda's more contemporary initiatives, one might cite German cinema between the world wars, as it espouses an interest in minimalism and simplistic graphics used in tandem with acoustic recordings and experimentation. Thibaut de Ruyter's essay on the abstract pre-history of sound art cites the experimental films of Oskar Fischinger and Hans Richter as particularly evocative of this "obsession" to "use abstract figures to convey the rhythm, melody and pulse of music."[126] Such experimentation with amalgamating imagery and musical methodology correlates well with Ikeda's ideology of art making. Furthermore, by melding new technology in musical and mathematical media, Ikeda incorporates the cinematic strategies of video projection and looping. Each performance provokes a new experience for viewers as no two aspects of an Ikeda installation can be carbon copied onto a new landscape. Like the computer cutting mechanisms discussed by Lev Manovich in his Essay on digital cinema, Ikeda transforms data that might communicate "sequential narrative" into a kind of "spatialized narrative" fashioned from "numerous layers of looped actions which seem to be taking place all

[125] Tribe, 62.
[126] Tibaut De Ruyter, "Volume minimal, un art de la projection du son / Sound Art, Minimal Elements," *Art Press* 315 (2005), 52.

at once, a multitude of separate but co-existing temporalities."[127] Thus Ikeda's algorithms parallel digital cinema, reverberating with the basic properties of the pixel and computerized visualizations.

In terms of particular projects, Ikeda's *Spectra* parallel Rafael Lozano-Hemmer's *Vectorial Elevations* (1999), in echoing not only the aesthetic of light projections on the night sky, but also the conceptual emphasis on the potential for technology to create participatory performance.[128] Likewise, this effect echoes Tribute in Light (2002), the Julian LaVerdiere and Paul Myoda piece installed as vertical beams memorializing a post-9/11 Ground Zero. Deliberate collaborations with diverse disciplines including choreographer William Forsythe, contemporary architect Toyo Ito and performance collective Dumb Type, firmly situate Ikeda in the realm of the ever-informed by outside sources. Furthermore, countless visual and video iterations by other authors exist on *youtube*, with the artists' musical compositions as soundtrack to various and sundry visualizations. The potential manifestations of Ikeda's work are infinite, and perhaps that is his point.

By converting audiovisual laboratory experiments into participatory and mobile installations, the soundscapes produced in Ikeda's work remain prone to annual iterations at other locales. Thus, his work contributes to the experimental geography discussed by Nato Thompson and explored by Guy Debord such that they might merit consideration through "a new lens to interpret a growing body of culturally inspired work that deals with human interaction with the land."[129] Playing with space and sound in tandem, Ikeda invites participants to confront the "geologic and urban conditions around [them] and indicates that these forces produce [their] sense of self."[130] No one participant benefits from the pretense of intellectual privilege: each individual's capture of the abstract "infinite" or "sublime" carries equal significance in creating our understanding of international and internal landscape on a meta-musical platform.

Ever mediating the complexity of new media, Ikeda's work orients toward accessibility rather than a heritage of "handed-on" hierarchy as established through the exhibition of obscure and inaccessible intellectual property; this new medium with which he experiments recalls a memory of musical and mathematical advances not meant as the "preserve of a scholarly caste…[but rather as the] social…banked information [which] is accessible to anyone, and this

---

[127] Lev Manovich, "What is Digital Cinema." manovich.net/digital-cinema.html, 1995, accessed December 11, 2010, 10.
[128] Tribe, 62.
[129] Nato Thompson, Experimental Geography: radical approaches to landscape, cartography and urbanism (New York: Melville House, 2009), 14.
[130] Ibid., 16.

accessibility is as instantaneous as its recording."[131] As artist-author, Ikeda facilitates the experience of his audience, as "agent of the masses[, h]e can lose himself in them only when they themselves become authors."[132] Such is his provocative expectation: Ikeda promotes an artistic soundscape where the mélange of media available drive home a definite message, and create an atmosphere suited to the individual and infinitely translatable.

Such philosophy supports even Baudrillard's refutation of a fixed structure to technological media as discussed by Enzensberger. A lack of didactic content reaffirming the visual and experiential renders Ikeda's work open to interpretation and re-iteration in new and different locales. Though he experiments with binaries, his projects refute blanket distinction; in the simplicity of his juxtapositions (black & white, light & dark, 0/1, +/-, noise/music) he produces a blurred environment wherein "the aegis of the media is a formal surpassing of the categories of *faits divers* and politics, and of their traditional separation, but only the better to assign them together to the same general code."[133] For Ikeda, coding accepts a necessary "reciprocity," an "antagonism of interlocutors," such that viewers participate in what is "received" and, to each, individually and infinitely "emitted."[134] Thus rejecting the ideology of a "semantic content that is assumed to be legible and *uni*vocal," Ikeda creates sound and lightscapes that pluralize the producer, amalgamating the encoder and the decoder over a *media*ted message. Removed from the obscurity that can sometimes accompany abstraction, Ikeda situates his œuvre in the realm of unpretentious user-generated content. The atmosphere he creates depends inherently on each participant's experience of the infinite, and then though coded, his work is not encoded into the realm of obscurity and inaccessibility. Making palpable the mathematical absolutes through the sublime and infinite attributes of his musical compositions, Ikeda makes his media the method for communication.

Still, Ikeda produces his own œuvre uninfluenced but actively appreciated by the "users" who encounter his works. No two experiences are parallel, but no single experience can be generated from the intellectual effort of a single entity. His work revolves less around user contribution and more on modification of user experience: a collaboration strengthened by user participation, ensuring that it is both unique and epic, defined dually by the immersive conditions of his installations and the personal geography and disposition of each individual in the exhibition

---

[131] Hans Magnus Enzesberger, "Constitutents of a Theory of the Media," *New Left Review* 64 (Nov/Dec 1970): 13-36. Reprinted in *The Consciousness Industry*, trans. Stuart Hood. New York: Seabury Press, 1974.
[132] Ibid., 275.
[133] Jean Baudrillard, "For a Critique of the Political Economy of the Sign" trans. Charles Levin. The New Media Reader, 264, in Noah Wardrup Fruin and Nick Montfort, eds. Cambridge, Mass: MIT Press, 2003. from the French "*Pour une critique de l'économie politique du signe*."
[134] Baudrillard, 265.

space (and potentially, beyond).

In a domain chronicled by disciplinary amalgamation and artistic reinvention, Ikeda excels at syncing sound and sine curves, blending audio and optical exercises to explore human perception. Echoes of Ikeda's œuvre reverberate throughout works by Carsten Nicolai and Carl Michael von Hausswolff, contemporaries who continue to engage with technology to produce *electro-sonic* experiences such that "[t]he sound loops by Carsten Nicolai…and the amplifications of Carl Michelvon Hausswolff have neither beginning nor end…just a residue that more or less occupies the space."[135] Ikeda distinguishes himself from these contemporaries through his ability to make music that fuses the simplistic with the technological, the language of the common man with that of the computer programmer. Perhaps in this respect, he departs most significantly from precedent and prefigures a future where the music scene "relate[s] to the canons of minimal and conceptual art, which is something that none of the exhibitions of sound art have yet done."[136] It is in this minimalistic musicality that Ikeda excels; and it is for this distinctive quality that he remains one of the most prolific and innovative artists exploring the physical properties and performative potential of *la musique de nos jours*.

When looking to the future, the progress of Ikeda's work and that of his contemporaries likely forecasts an increase in collaborative and interactive artworks. Though we may suffer from the "information overload" compounded by the internet and the ubiquity of technological communication, our appetite for additional stimulation seems insatiable. Artists and algorists must respond with an enthusiasm that like Ikeda's, voluntarily delves into the depths of human perception to create immersive experiences. Algorists began by collaboration with programmers and technicians to blend art and computational sciences for the 21st century; now that artists have stronger computational base, collaborative efforts are exploited to combine completely divergent disciplines. Progress therefore implies that an increase in artist experience with new media will correlate with an increase in collaborative efforts to achieve even more epic and interdisciplinary ends. Furthermore, it seems only a matter of time before the emphasis on individual experience is outsourced to personalized art pieces provided to each and every viewer on a unique and personal basis. It seems one cannot exit a contemporary art museum without a souvenir, a takeaway suited to the individual's choice and circumstance; we have come to expect a personalized experience and this expectancy is unlikely to dissipate. As Manovich asserts, with new media and cinema before, the "logic of replacement" becomes the "logic of addition" and co-existent collaborative

[135] Tibault De Ruyter, "Volume minimal, un art de la projection du son / Sound Art, Minimal Elements." *Art Press* 315 (2005), 54.
[136] Ibid.

effort.[137] Utopic though it may seem, digital developments continue to be predicated on an interdisciplinary amalgam of teleological advances. Progress in Ikeda's case seems poised for such predictions.

Perhaps more pressing of late is the preservation and conservation of such collaborative, and essential ephemeral, performances. Issues of authorship arise when un-credited collaborators contribute to the same work; how then does one catalogue a piece for an archival collection? Furthermore, how do you store data streams? Can you consider the surrogate record compatible with the original? How do you catalogue experience in real-time? Such collaborative creations necessarily blur the boundaries of creativity, of the creator/user binary, rendering the cataloguing and archival recording of these installed works all the more frustrating and problematic. With time, technology may solve these problems; for now, they persist.

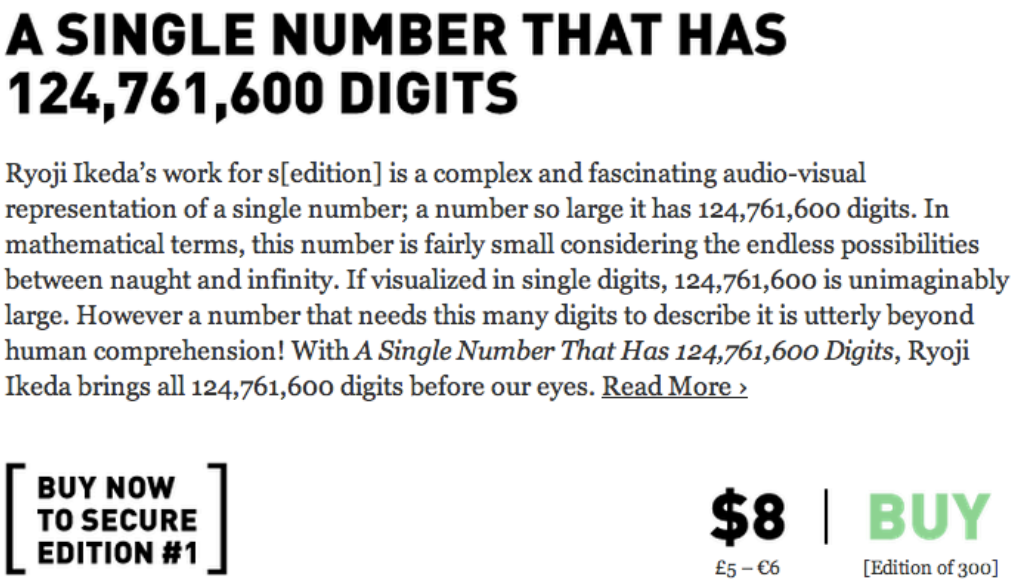
Ultimately, perhaps a departure from a discussion of audio and mathematical technicalities will again surface the preservation issues here in question. The creative nature of Ikeda's work complicates conservation, creating a bubble of uniqueness around his œuvre that renders any blanket program of preservation impossible to apply. He is not alone in this unique creativity expressed in code but also in algorithmic practice, where an individual approach to design patterning makes his genre of creative production that much more specialized and that much more difficult to incorporate into existing archives wholesale. Aspects of Ikeda's work also implies remix and glitch installations which rely on the versioning of his own projects, the unpredictability of error and mistake as incorporated into the intentionality of the piece. As we proceed in endorsing the model of a collaborative archival system for preserving new media pieces, we must necessarily appreciate how such individual authorship could incorporate into collections.

In further addressing concepts of authorship in remix and deejay culture, where mashups are created by amateurs from an originator's œuvre, the archetype of the rogue hacker-artist and potentially preservation specialist emerges. Nicolas Bourriaud's discussion of *Postproduction: Culture as Screenplay: How Art Reprograms the World* touches on some of these issues and provides them the academic sanction for adoption into the theory of fine art-making, and arguably, fine art preservation. He draws an interesting analogy between deejaying and contemporary art. discussing the concept of remix in terms of re-programming existing art, wherein artists

[137] Lev Manovich, "What is Digital Cinema." manovich.net/digital-cinema.html, 1995. Accessed December 11, 2010, 112.

reinterpret the movements and aesthetics of precedent in a adapted new media interpretations.[138] He further predicts the fusion of dee-jay with contemporary art production: "Soon, Do-It-Yourself will reach every layer of cultural production: the musicians of Coldcut accompany their album *Let us play* (1997) with a CD-ROM that allows you to remix the record yourself."[139] He further predicts the conflation of producer and consumer, as "[t]he ecstatic consumer of the eighties is fading out in favor of an intelligent and potentially subversive consumer: the user of forms." Even outside the remix and mash-up making of deejaying, the user has become the productive artist in the context of new media, and this model of the user-artist may well echo in the domain of the conservator as art media requires progressively more specialized technicians and volunteer conservators for maintenance.

To that end, movements like s[edition], an e-commerce website attempting to build a profitable model for the sale and distribution of digital art, might also provide a preservation venue for digital posterity. A recent feature of Ryoji Ikeda's work[140] in the s[edition] marketing email dispatches, illustrates how such a modern model for preservation might operate.



By leveraging its network of distribution, from email listservs to online catalog, where it limits the quantity of digital file sales to maintain a certain premium and price point, s[edition] might contributed to preservation initiatives in a massive distribution effort to promote multiple copies of artworks across the globe. Archival and library initiatives have long embraced the

[138] Nicholas Bourriaud, *Postproduction: Culture as Screenplay: How Art Reprograms the World*. New York: Lukas & Sternberg, 2002. Accessed March 15, 2012. http://www9.georgetown.edu/faculty/irvinem/theory/Bourriaud-Postproduction2.pdf.
[139] Ibid., 14.
[140] Ryoji Ikeda, "A Single Number Has 124, 761,600 Digits." *S[edition]* http://www.seditionart.com/ryoji_ikeda/a_single_number, accessed March 26, 2012.

concept of LOCKSS (Lots of Copies Keep Stuff Safe) for archival practice, but without a way of ensuring that type of dissemination, digital art fails to adhere to this model. S[edition] might facilitate such a crowdsources program of archival practice. Ultimately, in embracing the culture of hybridity and remix already inherent in electronic musical practice, we might hope to engage with amateur archivists at the profit of New Media Art.

In the work of Ryoji Ikeda, the inherent themes of remix and reinstallation indicate that the work itself already expresses a comfortable relationship with these practices. Throughout all of Ikeda's works and installations, performances, and projections, commonalities link even his most complex and blurred conceptions. Often musical and mathematical in nature, Ikeda's œuvre seems characterized by a compulsion to distill the bigger questions into a palpable and process-ready code, which might be translated and reinterpreted from medium to medium, from computer to human processor, from person to person. Laced with an active questioning of the sublime and the infinite, his works appear deceptively empty, easy, uncomplicated by mechanisms though informed by intense algorithms. In prognosticating about the future of such interdisciplinary minimalism, one can only assume that the new media trajectory will lead toward increased disciplinary amalgam, toward more synergistic and individualized art pieces that appeal and respond to each viewer uniquely, infinitely, subliminally sublime in scope. Without fault, the work of Ryoji Ikeda contributes to this effort, an effort, however humble, to encourage visitors to take pleasure in dual apprehension of the music and the math, to count without being aware that they are counting.

.: CHAPTER IV :.
FUTURE-PERFECT PRESERVATION

"The library will endure; it is the universe"

– James Gleick, *The Information*, 2013

"Software is a tool for the mind…[T]he science of genomics (the study of the genome) and the collaborative scholarship of Wikipedia were not possible without the aid of software…[which] encourages new and different ways of thinking."

- Casey Reas, *Form + Code*, 17

"Auto-destructive art and auto creative art aim at the integration of art with the advances of science and technology."

- Gustav Metzger, *Auto-Destructive Art Machine Art Auto-Creative Art*, 1961

Many media, arts or otherwise, were built for destruction, to be forgotten. The work of Dada and Surrealist artists, like Man Ray's *Object to be Destroyed* (1923) embraced the destructive aesthetic while reifying conceptual ideologies that inform much new media output today [Fig. 10]. Far from the free association that often connects iconoclasm, natural disaster, or military devastation with "destruction" vis-à-vis art, certain media seem self-consciously destined for dissipation or slow erosion from institutional memory: street painting, sand castles, ice sculptures among them. Like these media, the public art works of Gustav Metzger (1959-69) defined in his manifesto on "auto-destructive art" responded to the destructive potential of nuclear power with disposable public installations. In each case, artworks are designed to fail, to occupy a self-consciously ephemeral moment in human memory. However, the domain of new media and its implied variability departs from these deliberately destructive precedents in intention if not in outcome. In the absence of treatment, the variability of organic material, carbon based glues or binders ensures that certain paintings have a timeline termination point. The delicacy of certain friable pastels, or paints prone to flake, adds a layer of conservation concern to works on paper or some other more "traditional" carrier. Still few media art types were constructed as unconsciously vulnerable and immediately variable as "New" Media. Perhaps because these 'new' media are so diverse in what they might include, the languages so vulnerable to change, the code so muddled with dependencies and subject to the updates of so many operating systems, browser, and APIs, perhaps because of all these factors (or features) New Media remain the of the most precarious art domains to collect and one of the most difficult to conserve.

The sheer diagnosis of problems in preservation requires an array of technical competencies that few conservators are equipped to master, and few institutions feel ready to fund. Culling from a hybridized population of engineers and avant-garde artists, the New Media

Art community does not lack competencies to this end, but the traditional approach to preservation practice lacks the innovation and ambition necessary to harness their collective capacities. Museums and institutions traditionally saddled with art preservation actively attempt to retrofit New Media art to their traditional cataloging and conservation workflows without appreciating how different the dialog might be for new media.

If coding as a source of New Media artworks is an action analogous to speech as works like Geoff Cox's *Speaking Code* (2012)[141] and Gabriella Colemen's *Coding Freedom* (2013) might suggest, then we are aiming for a future perfect tense to set the tone. In many languages, future perfect verb conjugations indicate that something phrased as a future action will have a determined deadline; we want to give our archival future a plan for definite completion. The following two themes: Social Media Salvation and Sharing Culture note two basic trends iterating throughout the programming community, and the embrace of either or practices promises to usher preservation toward progress in cataloging and archiving New Media.

Furthermore, few authoritative texts have approached this problem with anything more substantive than acknowledging the issue and listing examples. It seems that in our embarrassment for failing to plan for the eventual and inevitable destruction of these pieces, we have edited from immediate history an authoritative instructions and standard procedure for New Media Preservation, and while this thesis does not attempt to correct this absence, it does attempt to cull from multiple disciplines in modern archival and library science practice to suggest a suite of potential solutions built on a platform of crowd-chive documentation.

What is the *crowd-chive*, and how might this be the answer to new media atrophy? As defined at the beginning of this essay, the archive, or storehouse for records and institutional memory, originates from the Greek ta *arkheia*, or "public records," from arkhe for "government," the "beginning, origin, first place."[142] Thus, the crowd-chive is the product of merging this ancient concept with the colloquial operations of the crowd-sourced internet environment, wherein the masses aligned via electronic connectivity become the source of productive and efficient work distribution across multiple nodes in parallel. Like the parallel processing executed for efficiency in computer systems, this concept of the crowd-sourced archive, the archive built on the networked intelligence of the internet-enabled world might be the most reasonable source

---

[141] "If program code is like speech inasmuch as it does what it says, then it can also be said to be like poetry inasmuch as it involves both written and spoken forms," see Cox, *Speaking Code: Coding as aesthetic and Political Expression* (Cambridge, Mass: MIT Press, 2013), 17. Also, see Coleman's chapter on "Code as Speech," Coleman, E. Gabriella. "Coding Freedom: The Ethics and Asethetic of Hacking," (Princeton: Princeton University Press, 2013), 161, accessed February 15, 2013. http://gabriellacoleman.org/Coleman-Coding-Freedom.pdf.

[142] Dennis Harper, "Etymological definition of 'archives (n.),'" *Online Etymology Dictionary*. Accessed March 29,2013. http://www.etymonline.com/index.php?term=archives&allowed_in_frame=0.

of progress in preservation. The following section will explore this phenomenon as it manifests in current (albeit siloed) initiatives, and postulate how it might operate in the ideal conditions of networked unity.

:: SOCIAL MEDIA SALVATION: HAX0RS AND ARXIVISTS ::

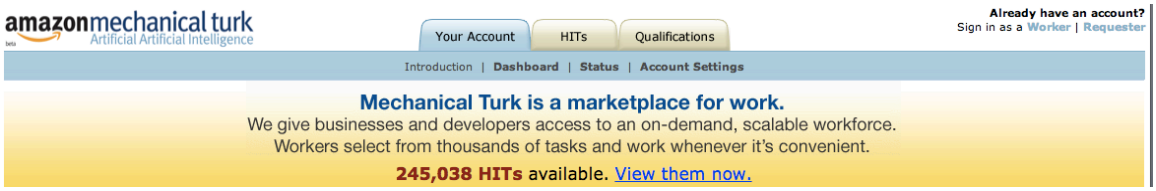
"The most basic thing computers can do for galleries is to keep accurate, permanent records of their collections."[143]

- "Cherubs and Computer Geeks," *The Economist*, 1992

"In the digital age, images are lost but rarely deleted, never finalized. Everything is all set to remix. From valueless fragments these found images coalesce as work of art."

- Joanne McNeil, *Endless Archive*, 2011

Much of the traditional workflows of conservation education and conservation practice place the archival authority of artworks in the domain of institutional repositories. The advent of New Media Art however, in its interface with networked computer systems, allows for a democratization of efforts and the development of collaboration platforms to potentially diffuse this authority across populations rather than relegating it to individuals. Graphing structures like those in social media build semantic connections between friends in a social network; such networks also provide for distributed workflow systems like Mechanical Turk hosted in Amazon's Cloud Services. These resources already propagate in the works of New Media Artists comfortable with their technical articulations; there is no reason why similar efficiencies might not operate in the realm of preservation.



To be sure, systems have even been developed to aid conservators in assessing the quality and condition of traditional media art for their work assessing the chemical and physical tolls of transport, study, and display. In 1991, Marion Mecklenburg, a paintings conservator at the Laboratory of the Smithsonian Institution was quoted describing a "system that enables

[143] "Cherubs and computer-geeks," *The Economist* [US] (15 Aug. 1992: 75+), *Academic OneFile*, accessed 14 Mar. 2011.

conservators to pick the best conditions for storing and transporting canvases."[144] Some of the mechanics of preservation already benefit from enablement of technology, mobile condition reports on portable iPads have illustrated this, but technology at the service of archival effort is slow to advance. In adopting even some of the superficial practices of social media, cloud storage (ensuring continuous hosting access), and the kind of crowd-sourced and community-based artist archives that already exist, we can hope to advance New Media to a similar state of its mediated[145] art works.

In terms of documentation like a common "community-based" crowd-chive, it might be helpful to interject with a brief but instructive anecdote. *Know Your Meme* is a website "dedicated to documenting Internet phenomenon: viral videos, image macros, catchphrases, web celebs and more" according to its mission statement provides a database of internet "memes," or popular content online. Wikipedia labels "know your meme" as an "encyclopedia," and in many ways, it represents the kind of crowd-sourced content construction of our information maps that we have come to expect culturally. KYM's operation is predictive, soon we might welcome college majors in the study of Cultural Meme-ory rather than Memory, studying how we archive and remember in our contemporary world. Such is the model on which cultural institutions might also operate as the population of this database is networked among contributors who donate their energies to archival efforts. The construction of this contemporary archive, while architected by a few allows the contribution and curation of content to network through many.

Currently, online museums and archives bake their systems in proprietary databases, they fail to crowd-source and distribute workflows which make the conservation of New and rapidly evolving Media difficult to document. But in harnessing the rhizomatic development of relationships and the crowdsourcing of content that Internet fora, those online archives permit these same kind of efficiencies. Cloud computing allows archivists to outsource the archive, and harness community-based cognitive surplus to productive ends.[146] Organizations like "Tagasaurus" in New York have already partnered with institutions to allow for such efficient metadata mapping.[147] In leveraging Amazon's Mechanical Turk to help archivists tag photos from

---

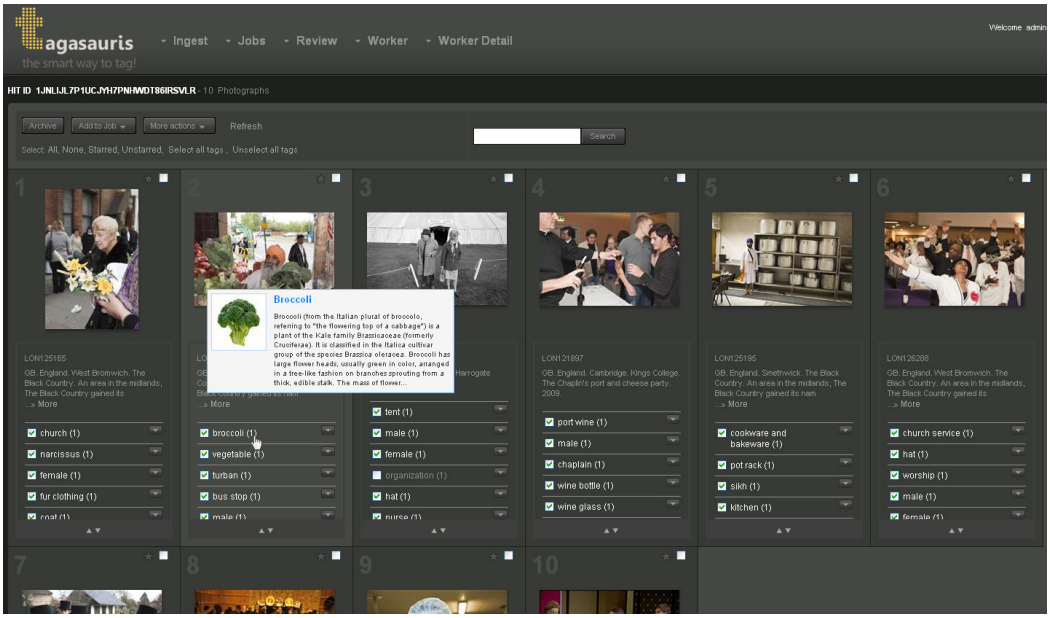
[144] Andy, Coghlan, "Computer simulates paintings on the move," *New Scientist 131.1787*, 28 (21 September 1991), accessed March 10, 2013, http://www.newscientist.com/article/mg13117874.100-technology-computer-simulates-paintings-on-the-move-.html.

[145] "mediated" in this context refers to "media-ful" or "media-enabled." New media artworks already master many technical media; archives need to take cues from artists as well.

[146] 'Cognitive Surplus' is Clay Shirky's term for the excess in intelligence that people now have in their freetime, for enacting "creative" rather than " sonsumer" activities, largely enabled by efficiencies in technology. See Shirky, "Ontology is Overrated: Categories, Links, and Tags," *Clay Shirky's Writings About the Internet*, 2005, accessed May 2011, http://www.shirky.com/writings/ontology_overrated.html.

[147] Philip Wolmuth, "Magnum Photos Tagging Game," *British Journal of Photography Online*, Feb 17, 2011, http://www.bjp-online.com/british-journal-of-photography/report/2027044/magnum-photos-tagging-game.

Magnum Photo's online collection, they have adopted social media imperatives and tapped the collective intelligence of an army of willing contributors to help an institution efficiently catalog its assets.



Admittedly, some contradiction is implied in the idea that we need to link ourselves to physical topographies but also adopt an invisible and obscure hosting solution for our assets (the Cloud). But the aim of this thesis rather, is to suggest how we might optimally construct maps to our data, how we might clear the archival pathways to our accumulating artistic heritage in New Media, and doing so requires a reliance on new architectures, on new platforms for managing assets and new paradigms for preserving our www.orld. Commenting on our disconnect from hardware in tandem with continuous dependence on the digital, artist and theorist Olia Lialina acknowledges this ongoing oscillation between the digital and the physical in *Digital Folklore* (2009): "…when all physical burden (including ownership is taken from the user, computers must still exit somewhere else, just away from our line of sight. Probably in a noisy data-center full of glowing hot processors and spinning hard disks, and our bodiless data will be stored within."[148]

The premise is rather that the cloud and other wireless technologies afford us a new digital architecture for information, a way of wrangling impressive processing power and distributing workloads across a broader population. It is only as nebulous or nuageux as we choose to allow it to be, and certainly in no more obscure than current approaches to archival construction. Among those embracing this new architecture are those in the digital library communities. The aforementioned Digital Public Library of America is built into this cloud

[148] Manuel Buerger, Dragan Espenschied, and Olia Lialina., *Digital Folklore* (Stuttgart: Merz & Solitude, 2009) 54.

architecture, where developers harness the idea of Cloud space as a service across the globe via Google mapping and communication tools, via Amazon Web Services hosting solutions and big data crunching engines built on Virtual Machines (machines with computational muscle, architected in the cloud). Even the The Internet Archive (http://archive.org/) and it's Wayback Machine, a nonprofit digital library that provides free backup of webpages and web content as the internet ages to adolescence, provides ways for users to contribute via an application programming interface built on Amazon's cloud S3 API structure.[149]

This digital ecology enables remarkable user empowerment, allowing powerful storage and processing and an ability to promote authority, authorship, and an interactive web-scape more than ever before. Born without an index, the internet proves to be one of the most dynamic and openly populated landscapes of our existence. It has seen the tenure of other hosting solutions (like the now absent Geocities) and publishing platforms (like LiveJournal, MySpace, Wordpress, Blogosphere blankfills) as well as "social" networks (Facebook, Github, Twitter) fabricated from the bits and bytes, code and pixel constituents of contributors. Though the mythical index has been supplanted by the search engine, thereafter optimized by the algorithms of proprietary companies (like Google), it is functionality is still "free." The Digital Libraries and archives of this space are likewise the province of volunteers. The preservation efforts that they initiate in archiving internet information are the possession of the population contributing, no longer of the proprietary institution collecting. In fusing Guattari's ecologies of environment, society, and (collective) mind, we actively built out a continuously iterating virtual machine in a free or at least flexible market. When we contribute to the internet, we contribute our social energies to amateur publish content, but we could be archiving our art world or adding our expertise to a collaborative archive that spans all media and domains. Wikipedia has initiated this for general knowledge, but why not build an archive of New Media Art that harnesses those collective energies for more than just cataloging, for conservation? The future of New Media will rely on mining the energy of the social web.

Perhaps this suggestion seems too insecure; we culturally associate security with physicality, uncertainty with ephemerality. The idea of hosting already friable content in a virtual environment reads as intimidating. But this suggestion, that we leverage social media, that we harness collective intelligence and repurpose social energies is no less insecure than developing a continuous dependency on local hardware or physical archives. To retrofit a pop culture example, a recent *ReadWriteWeb* article discusses the complexity of "personal" property affordances, in

[149] Matthew Casperson, "Internet Archive Releases Amazon S3 like API" *Programmable Web Blog* (May 10, 2010), http://blog.programmableweb.com/2010/05/10/internet-archive-releases-amazon-s3-like-api/.

how "jailbreaking" or opening Apple limitations for the operating system, your iPad remains illegal while jailbreaking your iPhone is not. Arbitary and proprietary control of hardware devices, of physical systems, bind us to dependencies that we cannot always control. The nascence of the web provides a new frontier for democratic engagement with archival *and* policy architecture. Dangers abound when considering how free and open institutions managing media will approach these types of imposed control. If a collection of media on solid storage devices deteriorates (floppy disks, CDs) then the library and museum trend is to push for migration to a digital format, but according the *ReadWriteWeb*'s analysis,[150] such practice might be illegal. What this implies for preservation moving forward, is that how we archive, ingest, and appreciate media moving forward, might be controlled by proprietary companies with strict hardware display and operation specifications. Hardware keeps us hostage as much as more ephemeral platforms, and preservation programs are at the mercy of both.

As we look toward the collaborative digital archive, it remains important to view this opportunity to crowd-chive our New Media with reservations. In the open source ethos, a methodology powering multiple disciplines in the sciences and technology, we find the foundations of a community who pushes for free distribution and access to information, projects, programs, and code. A noble initiative too be sure, but one that surpasses quixoticisms if carefully developed to promote peer to peer progress without devaluing individual initiative.

To bring this thesis full circle from title to end trajectory, Olia Lialina's *Where did all the Computers Go?* provides another expression of caution with regard to our progressively less-than-wired world: "…It is not difficult to understand why "wireless" became the synonym for "wireless networking": Data running through cables was already difficult to grasp, it's just natural that now it floats around everywhere like *ether*."[151] Archives cannot depend on traditional practice or legacy physcialities; preservation programs must embrace the mutability and variability of post-media ether.

:: H4CKER ARCHIVES ::

"Software art on the one hand brings software culture into the art field, but on the other hand it extends art beyond institutions."

- Runme.org collective, About, 2008

"Generative design has emerged from its niche existence in the last few years and deserves to be available to a broader public."

---

[150] John Paul Titlow, John Paul, "Yup, Jailbreaking Your iPad Really Is Illegal" *ReadWrite Hack,* (October 28, 2012), accessed November 10, 2012, http://readwrite.com/2012/10/28/yup-jailbreaking-your-ipad-is-illegal.

[151] Manuel Buerger, Dragan Espenschied, and Olia Lialina., *Digital Folklore* (Stuttgart: Merz & Solitude, 2009) 55.

- Karin and Bertram Schmidt-Friderichs, publishers of *Generative Design*, 2012[152]

"Given hackers' proclivity for expressing cleverness, acknowledgment that they build on the shoulders of giants, need to garner recognition from others, and dual penchant for lauding populist collectivism and individual self-determination, what might these attributes reveal about hacker notions of personhood, creativity, and authorship?"

- E. Gabriella Coleman, Coding Freedom, 2013[153]

-

Increasingly, the formal art archive has migrated to more informal cyberscapes. The old guard of the gallery scene is being progressively eroded by the pop content of the blog and the e-commerce platform. Sites like ArtSpace (http://www.artspace.com/) and s[e]dition (http://www.seditionart.com/) provide accessible platforms for research, purchase and perusale of new media art. Art genome projects like Art.sy (http://artsy.net) and ArtStack (http://theartstack.com/) attempt to apply predictive algorithms to taste-making and promote easy art discovery across media in the same semantically enabled systems. Trends, sales, and new media find their forum in the pop blog and some of the most complete and coherent databases of New Media output publish with more timeliness than the typical museum. Even more formal initiatives like Rhizome's ArtBase, or the Whitney ArtPort have solid competition in impressive pedestrian databases like http://we-make-money-not-art.com/ or http://canopycanopycanopy.com/, which catalogs a variety of new media artworks, conferences, events, and interviews coupled with an impressive and advanced tagging system to facilitate search.

Initiatives focused on developing out solid metadata (data about their data) cull from groups of enthusiasts and artists more than institutions. Case in point, Archive Team (http://archiveteam.org) is composed of gamers and hackers volunteering time to archive the internet. With the motto "History is our future," Archive Team recruits impassioned developers and contributors remotely. The engine of productivity fueling their output runs on a wiki and collaborates openly in forums. The collective expertise of the organization stems from a hacker/maker mentality and modus operandi, and in this capacity, is incredibly productive. RunMe (http://runme.org) is a software art repository, launched in January 2003 by artists, for artists. It is an open, moderated database to which people are welcome to submit projects "they consider to be interesting examples of software art."[154] While the user interface might appear dated, the program for contribution and collective curation, the plan of artist as archivist seems a

[152] Lazzeroni, Claudius, ed. *Generative Design: Visualize, Program, and Create with Processing* (New York: Princeton Architectural Press, 2012): 11.
[153] E. Gabriella Coleman, "Coding Freedom: The Ethics and Asethetic of Hacking," Princeton: Princeton University Press, 2013, accessed February 15, 2013, http://gabriellacoleman.org/Coleman-Coding-Freedom.pdf, 116.
[154] Amy Alexander et al, *RunMe/About*. http://runme.org/about.tt2

more successful and noble approach than any institutional hosting service to date. Among those manifestos featured on the site, Javier Candeira authors a plan "Towards a Permanently Temporary Software Art Factory" that models this type of archival engine.[155] The primary goals for the project articulate as follows:

> "First, to allow and promote code sharing between artists and therefore increase their productivity.
> Second, to facilitate software art distribution of easily installed packages.
> Finally, to aid conservation of software artworks through community maintenance of these packages."[156]

In the space of assembly line art, as Candeira's "art factory" might suggest, the archive itself is in constant flux. The formalities fail to faction a Content Management System (CMS) that can capably house all aspects of New Media Art, thought many are trying to retrofit kludgier systems to suit their needs are not yet in place throughout institutions. Filling the archival and preservation programming gap, artists have become the archivists and curators of computer, internet, and new media. Projects like glitch artist Jeremiah Johnson's 0-Day Art (http://www.0dayart.net/) which responds to institutional control and monetization of net.art works with pirate warez versions that he bootlegs and reposts on the internet exemplify this practice. [Fig. 15 In hacker communities, 0-day warez hacks involve release proprietary software in another form on the day of its debut (hence the execution in a span of 0-days), vaguely analysis to a bootleg but championed as an expression of hacker skill if such security compromise can be achieved. Known nebulously as The Scene among hackers, Warez groups upload the files they compromise to hosting sites, ed2k or torrents which provide for their free download and access. 0-Day are applies this concept to New Media net.art, by releasing artworks on the day of their exhibition. The objective is simple, in attempting to combat museum and gallery model of "selling" net.art by restricting access, Johnson (aka null sleep) created an effort to maintain the display integrity and distribution venue of these artworks.[157] 0-Day art invites contributors and is ongoing.

His effort is remarkable and ongoing, not necessarily singular, but at the moment, pockets of similar programmers are driven by largely individual efforts. A more unified and sanctioned program of enlisting artists to a crowd-chive collective unobstructed by institutional bias would

---

[155] Javier Candeira, "Towards a Permanently Temporary Software Art Factory," *Readme 100* Commission. Dortmund, 2005, modified February 15, 2006, accessed March 15, 2012, http://runme.org/feature/read/+sustainability/+109/.
[156] Javier Candeira, "Towards a Permanently Temporary Software Art Factory," *Readme 100* Commission. Dortmund, 2005, modified February 15, 2006, accessed March 15, 2012, http://runme.org/feature/read/+sustainability/+109/.
[157] Joshua Kopstein, "0-Day Art: saving digital art one torrent at a time," *The Verge*, April 23, 2012, accessed March 25, 2013, http://www.theverge.com/2012/4/23/2961601/0-day-art-digital-art-torrents-piracy.

leverage these individual projects to more productive ends. Returning to the exhibition of *Les Immatériaux*, a collaboration between French artists at the Centre Georges Pompidou in 1985 via networked computers, the effort of the artist in the face of ephemerality, immateriality in this case, has become a new paradigm for New Media production and preservation. Note Domenico Quaranta's exhibition at 319 Scholes for *Collect the WWWorld: Artist as Archivist in the Internet Age* (http://collectheworld.tumblr.com/) or artist Jonathan Minard's 2012 Eyebeam fellowship to complete a documentary on Archival initatives (http://www.tumblr.com/tagged/archive-film). Interest in archives is ubiquitous, the potential if harnessed, limitless [Fig. 11].

Just as modernist artworks can be regarded as a reflection of the production machinery of their day (production of objects), the platform format too can be said to mirror the predominant industry of our time, namely the service sector. The prototypical archival platform espouses this in that it focuses on the exchange, interaction and distribution of information, what Pernille Albrethsen calls an essential "strategy is used both as the fundamental structure for entire exhibitions and works of art."[158] Here Albrethson invokes the concept of the platform, which has become pervasive in new media as an occasion for a shared ethic, a shared environment where authorship is distributed and artworks are the democratic property of a collective unconscious, bound for preservation in a likewise democratizing environment of community ethics:

> "So what kind of politics are we talking about? As already mentioned, general platform politics is about sharing – about establishing some kind of democratic setting for everybody involved. But, because of the particular structure of the platform – in which nobody stands out, everybody is invited in, and you never really know who is behind what – the platform attitude can, in the worst cases, also be viewed as the result of a mistaken concept of democracy. The platform artist/exhibition wants to get as far away as possible from the idea of the singular 'auteur', as well as that of the genius artist, and the platform structure helps to emphasize the notion of some kind of shared authorship."[159]

Recognizing issues of collective authorship and interactivity already prevalent in New Media artworks as opportunities for preservation is an essential part of a program. Developing out parallel processing for preservation: a mis-en-abyme methodology where the characteristics of New Media Art are the same characteristics that construct its archive provides a promising track for archival future. Investing in social hacker archives and sharing culture will help secure that trajectory.

:: SHARING CULTURE ::

[158] Pernille Albrethsen, "Platform Formalism," NU-E__FROM: *The Nordic Art Review*, April 16, 2004, accessed on August 10, 2012, http://www.nu-e.nu/nue.asp; also http://www.16beavergroup.org/mtarchive/archives/000873.php
[159] Albrethson, http://www.16beavergroup.org/mtarchive/archives/000873.php.

"The Internet is the homeland of copycats and digital natives. The Real World is the wasteland to reclaim."

- Domenico Quaranta, *Collect the WWWorld*, 2011

"The internet rejects traditional notions of ownership; it is comprised only of things available to share."

- Joanne McNeil, *Endless Archive*, 2011

In the online website for her exhibition Stranger Visions, a combined bio art and code initiative based on genetic sequencing for a 3D faces modeling from found DNA, bio-code artist Heather Dewey Hagbourg discusses here code for the project:

> The code underpinning *Stranger Visions* is *friendware*. It is neither open nor closed source, it is available only to friends. If you want to know more send me an email and let's make friends. heather@deweyhagborg.com.[160]

Such ways of managing intellectual property remain common among the growing population of open source aficionados in the coding commuting, who already embrace social coding platforms like Github or Coderwall for collaborating to version-control code on group projects. Thus, we inhabit a culture primed for sharing; if we based archival efforts on a similar platform, then we program to allow for archives that accommodate the expectations of those artists working in New Media, and building the constituents of our collections online.

Already the open source community has embraced this concept of crowd-sourced creativity for progress on problem solving. For coders, venues like Github for social coding or stack overflow for debugging provide platforms to post code and solicit feedback, edits, corrections. All of this is done in the name of efficiency and progressive improvement via community input. As artists and coders collaborate on new media art projects, this same expectation for community support in spite of proprietary software and patents persists. It seems reasonable to expect that the venues for preservation will adapt to mirror this mode of operation, if only to appropriately echo the community whose works it attempts to preserve. The existing examples of successful new media archival initiatives support this assumption, as few of them are based in actually museums and institutions, and more and more, online communities have provided the m

Such initiatives are not alone, as programs for open data and open source software continue to propagate on the internet. Examples abound in a development environment where organizations like Open Geo and Open Plans work to release geographical data and enable developers to map our physical landscape in digital form, create mashups (or remixes) of existing mapped content. In the wake of Creative Commons (CC) a non-profit organization dedicated to

[160] Heather Dewey Hagbourg, *Stranger Visions* (March 2013), exhibition at clockdtower gallery, New York City, http://strangervisions.com/about.html.

expanding creative output but issuing licenses that protect authors, artists and educators, sites like Archive of Our Own, a fan created version control platform for fiction and digitized text, constructs an archival and contribution engine by absorbing the open source practice of the platform forum and contributions to a shared goal via version control. Built by a community of online volunteers in 2012, The Organization for Transformative Works (OTW) attempts to answer an area of archival need through collaborative practice outside the institutional context. Their mission to "preserve the history of fanworks and fan cultures" might be adapted for New Media Art.

Even more formal institution initiatives build and even depend on community contributions, but the embrace of this policy as a paradigm iRhizome.org captures metadata on its collection based on the user-generated content of the artists themselves, according to artist surveys and user-generation protocols defined by the Franklin Furnace and the Variable Media Questionnaire [Fig.12]. Those institutions planning for preservation recognize that information collected on ingest can help with the preservation process moving forward. The skeletons of institutional progress exist but institutions need to adopt the hacker mentality of collaborative production and absorb some of the social and sharing ethos that would enable a robust crowd-chive for future art.

Likewise, metadata today presents some potential solutions to the issue of archiving the arts. Preservation Metadata Implementation Strategies (PREMIS implementations) mashed up with Metadata Encoding Transmission Standard (METS) wrapper bundling of various schema provide some standards for packaging metadata for archives. Similarly, optimization for the semantic web, for relational databases build on a foundation of open source and social computing, present archivists with the utopic model for New Media management moving forward. Preservation metadata, a methodology for preservation programming, coupled with the map making that wrapper schemas like METS allow archivists to fuse the metadata for multiple purposes into the same packages, providing a metadata program for multimedia are which has, until now, relied on fractured storage structures across multiple schema. For New Media and born digital art projects, these metadata maps are ideal hosts for the types of structured data and semantic relationships that art archives will require moving forward.

Likewise, for standardization and efficient search of such an archive, a classification schema specific to art might be staged totackle taxonomic issues of categorizing new media. Examples include VRA Core, Categories for the Description of Works of Art (CDWA), and Richard Rinehart's Media Art Notation System (MANS), all which present promising extensions in metadata management for New Media, but there adoption in the face of legacy systems and

institutional constructs for tradition media archives often lead to slow uptake, stagnation, and archival atrophy of New Media on the verge of obsolescence.

In counseling such standards to align methodologies with social and shared media platforms, the trends of human tendency and popular media will likely guide and preservation effort. There exists a paradoxical affinity for customization and specificity in the face of aggregation and groupthink on the internet. As users, we want profiles that tailor our digital lives personally, but we also ask that everything to interoperate, that technology exist at the service of efficiency. We expect proprietary platforms to provide an API, a way of coordinating login through Facebook or Twitter. We want our metadata schema (that data that keeps records of our digital objects) to be trustworthy and lossless, specified to its domain but open to interaction with other schemas, automated and invisible. The way to archive digital art and new media ultimately tangles in this space of oxymoronic expectation. We want to thoroughly archive every aspect, but we lack the hosting space, the time and the bandwidth expertise to adequately fashion an organic archive on the internet. This is why we need an army, an archival engine built by artist, hacker, makers with an intimate understanding of our post-media climate and our present condition, as well as a sensitivity to the open ethos of our internet framework In adopting some cultural practices from current social and sharing initiatives among coders, institutions can hope to grapple with New Media Art output.

Architected in the avant-garde, infused with the hacker or maker mentality already powering so many initiatives online, the ideal New Media archive would assume both the structure and efficiency of cloud-based services, the cognitive capacities of networked users, the collaborative ease of social technologies to craft the crowd-chive. An encyclopedic effort, initiated in the eighteenth-century Enlightenment and instantiated in numerous rogue platforms on the internet, the crowd-chive absorbs the ambiguity of authority and the imperatives of interactivity already cited as important characteristics to the New Media works case studied here. It proposes a paradigm shift from the institutional-based hosting of traditional conservation programs to the open platform of the Internet as archival hub, as metaphorical firmware for our friendware moving forward.[161]

[161] Firmware in this case playfully references persistent memory (combined with program code plus data), and friendware playfully references Heather Dewey Hagbourg's platform for data management, a methodology that implies sharing with friends.

.:: AESTHETICS OF OBSOLESCENCE – A CONCLUSION :.

"Art needs [conservators] like the web needs Google. I don't like using Google for various reasons, but I do, all day, every day."[162]

- Saul Albert, "Re: Some Perssonal Thoughts on NODE.London," 2006

Characteristics of New Media Art as suggested by the preceding case studies point to a trend in progressively more personal projects, that is, projects that draw from and individual user or patron base, solicit feedback, promote interactivity and individualized experiences. It seems reasonable to expect that the customized interfaces and account systems we anticipate on the internet (the Gmail, Amazon.com, and commercial account systems who welcome us with a "Hello User" every time we ping a page with frequency) will follow to dictate our expectations in interactive art. Increasingly customizable digital interactions will naturally give way to customized art experiences in installations, performances, and even more interactive new media. The progress of electronic interfaces from the brutality of the computational command-line to the softened visual display of the GUI to the community-driven environment of the social graph seems likely to echo ever-more in the art world.

The trajectory of conservation programming likewise shares a need to respond to these expectations. Rather than prescribe a program for new media preservation, this thesis anticipates that a crowd-controlled effort to conserve through collaboration will slowly supplant more formal and institutional systems for conservation and preservation. That the *artist* as archivist will become the *artists* seems reasonable, securing New Media in posterity via plurality and the social stimulation of collective intelligence. In the same way the digital art curators begin to purchase digital artworks in collusion, and initiate file storage across multiple institutions, so too digital art conservators and their associated conservation programs will become incorporated into the domain of the community, or at least, collections of institutions in collaboration.

To this end, this thesis adopts the ethic of the Critical Engineer (http://criticalengineering.org/) as described by a community of collaborative hackers and artists with regard to developing technologies that augment rather than encumber our future selves. In the ten-point manifesto authored by an international community of artist-hackers including Julian Oliver, Gordon Savicic and Danja Vasiliev, the Critical Engineer community defines a protocol for considering technology with continuous and ever-questioning attention. Perhaps, in the context of New Media Conservation points eight and nine are the most instructive:

---

[162] Paraphrase of Saul Albert, who used "curators" in this context. His quote loses significant but the sentiment is suggestive; we need conservators en masse, not in institutional singularity…we need a google of conservators to tackle New Media Art. See also Beryl Graham, and Sarah Cook, *Rethinking Curating: Art After New Media* (Cambridge, Mass.:MIT Press, 2010), 275.

> 8. The Critical Engineer looks to the history of art, architecture, activism, philosophy and invention and finds exemplary works of Critical Engineering. Strategies, ideas and agendas from these disciplines will be adopted, re-purposed and deployed
>
> 9. The Critical Engineer notes that written code expands into social and psychological realms, regulating behavior between people and the machines they interact with. By understanding this, the critical Engineer seeks to reconstruct user-constraints and social action through means of digital excavation.

Taken together, these points consider that the understanding of technology, and technology-based artworks, fits in the rhetoric of art history, and deserves the critical consideration whose lack Steven Dietz so lamented earlier in this paper. These points also emphasize a understanding of digital forensics, and archaeologic investigation as critical to developing theory, for technological ethics, progress, and by syllogism New Media studies.

In the spirit of this ever-inquisitive and open approach to analyzing new media, this thesis closes with an interview that anticipates an upcoming publication on this topic. What follows is the transcription of an informal, yet structured conversation between Richard Rinehart and this author, conducted as a preface to his forthcoming publication on *New Media Art Conservation: A Textbook*,[163] the first instructional manual on New Media Preservation of its kind to be crafted in collaboration with Jon Ippolito. Though not prescriptive or presumptuous about the fixed trajectory of this preservation program, this thesis closes with a critical conversation about the state of new media art and its need for archival documentation, standardization, and salvation, wrapped in the infinite potential of collaborative possibility.

[163] This should be appreciated as a tentative, working title, as the manuscript submission status and confidentiality of the project are protecting sensitive details until its release in 2014.

..: AN INTERVIEW WITH RICHARD RINEHART :.

Aurelia Moser (March 18, 2013)

Collaborative question text for this (though not prescriptive) is available via this permalink: http://piratepad.net/9BOrOVEdiu

Emphasis in the following interview (in **bold**) highlights the speakers and the salient points of the conversation, which effectively echo the concerns about precarious preservation evident in this paper, not as a way of normalizing the two, which are distinct episodes and perspectives in this ongoing conversation, but rather as a way of simply reconciling them for the purpose of this thesis.

Richard Rinehart is the Director of the Samek Art Gallery, Bucknell University and a seasoned Digital Media Curator involved in artistic and educational initiatives at UC Berkeley's Center for New Media and Art Practice. He is the author of many publications related to New Media including the MANS metadata standard and an upcoming textbook on New Media Preservation, to be published 2013-2014 with Jon Ippolito. (http://www.coyoteyip.com)

Richard Rinehart: That's me, thanks for calling.

Aurelia Moser: Great. Oh, thank you so much for being available, sorry about the time difference, I assumed...

Richard: Sure, that's all right. You might have to speak up, it sounds like you're in an echo chamber or something.

Aurelia: Oh sorry, can you hear me now? Is that better?

Richard: Yeah.

Aurelia: OK, cool, great. With respect to your time and everything, I just wanted to give a brief preface to...I think I explained in the email who I was, and what I was doing in terms of my thesis, but I wanted to just explain that quickly so you have some context.

Richard: Sure.

Aurelia: I'm a student at at Pratt Institute, I know Sunny because I was her TA for metadata, but I'm in a dual degree program so splitting between digital art and library science. My thesis connects both; it's about archiving new media art in a few ways, but it's focused on a couple of case studies of new media pieces that I've written about. My undergraduate background was actually in chemistry, I wanted to be a conservator but then I got into a lot of digital art and new media art, and I wanted to do that too. I feel like conservation will more and more require both competencies, so now I'm writing about...focusing on these three case studies, one is a net art piece, one is an immersive sound installation that's based on software that adjusts the sounds you hear based on how many people are in the room, and then the third is a generative bio art piece based on a bunch of Matlab code, and DNA synthesis. All of them incorporate code and software, but they all present different challenges to conservation.

Richard: Uh-huh.

Aurelia: So hopefully I'm going to talk about current conservation efforts, and archiving efforts, and then present some options for how you could care for these different media types.

Richard: Uh-huh.

Aurelia: Right, so that's my preface, and I was wondering if you could just give me a little bit of a review of your background again, and then why you're interested in this topic, and maybe about your book which I think you said is coming out next year, what you hope to address in that book?

Richard: Sure, well I guess let me start with the book, let me go back...the book, it's co-authored by Jon Ippolito, who I'm sure you've ran into in the literature, if not in person, right?

Aurelia: Yes, I probably have.

Richard: It'd be by Jon Ippolito and myself, and it could come out this year, I don't know, we've already turned in the manuscript and images with permission, so however long it takes them to whip the book out, 2013 or '14. The reason we wrote it was, well, the MIT press came and found me first actually and said, "Oh, we hear you're working on this 'preserving digital art,' and there aren't books on it, do you want to write one?"

Aurelia: Yeah. [laughs]

Richard: I thought, "Well, if I do it with Jon, then sure," because that's a lot about a book too. The reason why I thought a book would be worthwhile, was that they were right. They actually then made us go and do a survey of literature in the field, so we of course uncovered the fact that there really are no books on the topic. There are Journal articles, there are certainly a lot of online postings, there are a lot of conference presentations of panels and proceedings about it, but those all tend to be fairly short format kinds of considerations. At most a 20 page paper, or something, that would be the longest. Usually you'll have like *Leonardo*, or something in the Journal, and you'll have a four-page article, or you'll have a little video clip from a media histories conference in Banff, Canada, and one panel is...Everybody speaks for 10 minutes about preserving digital art, and then it's over. That's good, because it's a very dynamic field.

Obviously, there's a lot that needs to be said, and quickly, so the short format discourse...we thought it would be really interesting to write a book for a few reasons. One is, especially for teaching and instruction, so we're not writing it as a textbook, but if somebody is teaching a class on this, or related to this, and wants to assign some readings to the students to introduce them to the field, those writings don't really exist. There aren't that many. There's a lot of professionals, and very savvy, smart people, posting and writing about it, but not in an introductory kind of a way, right?

Aurelia: Mm-hmm.

Richard: You're just sort of jumping into the middle of the conversation, kind of stuff, usually. Tell me if I'm wrong.

Aurelia: No, no, I think it's also a very apprenticeship-based; you learn on the job, or you learn in a particular context, so I think that's completely true.

Richard: Yeah, exactly, and also the introductory kind of thought is not only for, say, students in a...like in Howard Besser's program at NYU, or something, preserving motion picture, moving image work, something like that. If you wanted to talk about preserving digital art. It's not only that though, it's also a way to bring in people from other disciplines, because similarly, if we want to be able to...We, meaning, "those of us, like you and I..."

Aurelia: Yes.

Richard: ...drawn to our interest in and preserving digital art, want to draw into the conversation people from related fields, like electronic literature, or people from the digital library world, et cetera, et cetera. Government archives kinds of people, there's a lot of intelligence out there, but again, how do you bring them into the conversation? They don't actually throw themselves onto the Conserv email list, and start chatting away, and if they do throw themselves and there, God love them. They won't necessarily get all the specific art history references and stuff. Again, the introduction serves to draw a younger, and then a broader, base into the conversation, and it gives us time to basically spend more time on the arguments, spend more than just four pages talking about why you should preserve something, or how you might preserve it, or why you do this way, and not that way. It allows you to actually build up an argument, for why you might do it this way or that way, and very much to point on that, a lot of the museum world, partly because of the urgency, and partly because...

I think mainly driven by the urgency, and **I guess there's this presumption that digital art really isn't any different, it's just art**. Museums tend to leap right to the logistics, they'll say, "Oh, OK, so we need...Now why would MOMA get into preserving digital art?"

"Well, one of the curators decided they wanted to buy the world's longest sentence," and OK, then one of their curators gets involved and says, "OK, where's the file? What file format is it in? OK, we need to migrate that off of that obsolete media onto some sort of RAID array, and bitstream checking, check in/check out system, so that we can assure its authenticity, and da, da, da, da, da. OK, let's get into it."

Which is good, given that there is actually some urgency around the problem, but it's also missing an opportunity, and the opportunity is, "Wait, wait, can we just for a minute step back and think, **'What works are we talking about preserving? What digital stuff ends up in museums, and what digital stuff is being preserved outside of museums?**'"

It's not always clear, and then that which is, which is identified as art, and then collected by the art museums for instance, there's a lot of room for, "OK, we'll wait, why are you taking that approach, as opposed to this approach?" "Well, because this is the artwork?" Well, we haven't really had that conversation yet. Where is the artwork located in a work of digital art? Is it the files?

It really the files that you need to care about? Like some original bit of additive code, or something like that? It may be, but we just haven't had those sort of conversations yet in the art world, and especially in the world of museum conservation, like, "Well, where is the art? Why would you take this approach as to that approach? Is it allowable to change the form of...change the underlying code of the art, in order to preserve it?"

"**Has anyone talked to the artist**? Do we have any sort of historical precedent, or theoretical basis for presuming that this level of variability is allowed, that isn't? Or is it just some conservator arbitrarily making these decisions in their head, or just as bad, some curator making

these decisions in their head?" Really, there's been no sort of community discourse about these things on any kind of a sustained level.

Then, if we do want to do things a little bit differently...well depending on how differently, we need to operate to conserve these works in an institutional context. We might need to change some of the practices of the institution, that might just be part of what we need to do to address these works. In which case, how do you unravel institutional practice? You can't just do it from a logistical level.

You can't just say, "Well, where preserving this file, and therefore we need to change the way MOMA works." Well, that's not going to fly. It's not going to work. There's no justification for it, so the other thing we want to step back and do is say, "Well, how do we need to change our thinking in order to preserve these works?"

We both agree that some things that we may need to consider will involve changing the way that institutions like museums think about preservation. "OK, well how are we going to take on that then?" Well, we have to figure out why haven't museums done things this way for so long? Why are they, perhaps, insistent on doing it this way? What are the values that are at work?

Let's pick open those, let's unpack that, let's question those values. Let's say, "Well, based on the history of museums, we can see why we ended up doing it this way, but here...the seeds of salvation are here, museums have evolved historically, and we may evolve again, and here are some theoretical reasons..." Maybe drawing on the rich discourse of art history about why we can justify, seeing things this way instead of that way, "...and here's why..."

We can address the larger questions, because that will help us change the bigger systems in order to accommodate new practices that might be necessary for preserving this stuff. Does that make sense?

Aurelia: Yes.

Richard: All that justifies the book, right?

Aurelia: Yeah, totally. You said that there isn't really an authoritative textbook...which I totally agree with, or anything on conservation, and this will be great. Do you think that there's a relationship then between conservation and curation in terms of how people learn and approach it in digital and new media? Because there's been, I think last year, there was a book, "Rethinking Curating," that was supposed to be approaching how do people retrofit their galleries or their museum systems to approach curator and from a new...to ingest this new media. Do you think that this will be more of a...kind of the partner to that type of publication?

Richard: Yeah, absolutely. Only this will focus on the collecting and preserving, but it will talk a lot about the curating, because like I said, collecting and conservation doesn't happen in a vacuum. It happens in the context of curating, of the art market, of artists production, of art institutions and their histories, and their practices, et cetera, et cetera. Professional degrees and training programs...so again, like in a book, we can hopefully tag each one of those things in turn, and very much be... There are more books on things like digital art forms themselves, outside the white box, curating differently. But people really haven't done the book yet on the collecting part of it, so yeah, it would definitely be there. Plus, I was just talking with a bunch of people recently about how the curating...I was talking with...Do you know Ben Fino-Radin at the...

Aurelia: Yeah, he went to school with me actually, yeah, mm-hmm.

Richard: Yeah, OK. I met with him, and we both are on an advisory board for Cornell, a project at Cornell. Wait a minute, I lost my train of thought. What was your question?

Aurelia: Curation, conservation relationship...

Richard: Oh yeah, the curation. Yeah, he's of the type where he's like, "You know, I know all about bits and bytes, and I'm leaping right to the..." I said, "Well what about this? Why are you doing it this way?" "**Well, that's a curatorial decision. That's somebody else's decision**." I thought, "**Yeah, it is, but that's kind of important**." These two kind of decision-making processes need to be coordinated, what the curator is deciding, and then what the conservator is doing, and my conclusion was that...**In the art world today, digital art has kind of been accepted into the mainstream. It may not be favored, but at least it's tolerated, and accepted, and acknowledged by the mainstream. But the mainstream art discourse right now isn't one of media specific disciplinarity, right?**

Aurelia: Mm-hmm.

Richard: **The art world today doesn't favor seeing art in terms of genre as defined by medium, painting, sculpture, photography, digital.** That's a very old fashion way of looking at things, so none of the curators really want to talk about digital art per se. They just want to say, "Well, that's just contemporary art." Which is fine, to a large extent that's true, but...in the curating part of things, digital art is just contemporary art. But then when it gets collected, and it gets into the conservation workflow, then it does become really important what medium it's in. It becomes really important not only in technical and logistical terms, but theoretical terms. Because a conservator is dealing with, for instance, digital art. Yeah, it's part of art, but they've got to conserve this stuff, which is different than that stuff.

It's different than oil paint, you conserve it differently, you can think about it differently. Then at the other end, once they conserve it, the curator again who's going to bring it back out in 50 years and exhibit, and presumably it will just be contextualized again, not really as digital maybe, but just, "Oh, well here some art, here's a bunch of art."

It's like this Venturi chamber, where it starts...nobody wants to call it digital art out here in curator land...

Aurelia: [laughs]

Richard: ...and when it gets into the crucible of conservation, it's all about it being digital art, and then at the other end, when it comes out the other end, and it's re-exhibited in the future, presumably it will be just like art again.

Aurelia: Maybe.

Richard: What am I trying to say? I think we may actually at the front and need to at some level sort of look at it as digital art is a special case in order for it to be conserved properly. Does that make sense?

Aurelia: That totally makes sense. I am wondering too, what's your preferred term of choice? Because I've been reading a lot about "new media" art versus "post medium" art people are saying, which I think aligns more with the curation approach that you just described. That it's, "We're beyond medium now, not into painting, and people aren't siloed..." [laughs]

Richard: Right, right.

Aurelia: What you think is the most contemporary term, or reference point, that you would prefer as the umbrella?

Richard: Well what we use in the book...To answer your question, we had to figure that out. **We used, "new media art."** I think we used it because it's recognizable enough that people would get it, it's broad enough that it could include not only digital, but also other forms of new media, and maybe hybrid forms, where there is a computer process controlling a robot in the gallery, or and installation inflates and deflates based on sensor input, or whatever, so that it can incorporate all that. **I realize it's really fuzzy, because every art form, every medium at some point was new media art, right?**

Aurelia: Mm-hmm.

Richard: Oil was new media at some point.

Aurelia: [laughs] Yeah.

Richard: It sort of begs the question, but you sort of have to take the term that's going to allow you to talk about the broad scope, and yet trigger in people's minds the connotation that's necessary, which is, "Well, yeah we get what they're talking about." I like to think of it not so much as having...that definition doesn't really draw the outlines of the form, it doesn't say, "This is new media art, and then on that side of the line, that's not." Rather what it does is that it says, "Here's...there's a center to media art that we know is very different than what came before, and in my mind, what's at the center of new media art is digital art. You know?

Aurelia: Yeah.

Richard: Art made on and meant to be presented on computational technologies. That's the middle, and then there's a bunch of stuff on the edge, computer mediated, virtual telematic performances, the hybrid robot with code, et cetera, et cetera. There's all this stuff that's, "Well, that's part sculpture, but it's part..." that's kind of at the edges. But there is something at the middle, which is the computational, so you can sort of go, "Oh, oh yeah, OK, I get it."

Aurelia: OK, and what do you feel is the most successful approach to conservation currently, like who's doing it the best? And, are there people that you interviewed, and incorporated into your book that you feel like...like is Rhizome the best approach currently for cataloging and archiving, and also attempting to tackle conservation, or what's the most progressive conservation program in the world you think?

Richard: Wow, that's a good question.

Aurelia: Sorry, yeah that's kind of broad, but...

Richard: I hate to say this, but **I don't think I would've written this big book with just one long argument if I felt like people had it under control already.**

Aurelia: Yeah. [laughs]

Richard: I don't feel like most people are doing a great job. If I were I'd be like, "Yeah OK, fine. Job done, what am I writing a book for?" A little bit plaintive, I guess, sounding to say that, but relatively within that spectrum, yeah I think Rhizome is doing a good job. One of the reasons I

think esteem Rhizomes effort is because they are so community driven that they engender conversations, and they listen a lot. Whereas museums are, especially when it comes to collections, definitely not community driven, it's very top down, and a lot of them have the hubris of centuries, and the culture of prestige, where they think they can say, "We don't need anybody's influence on this, we know what we're doing." Especially now in the post-medium era, it kind of adds to the hubris, because they go, "Digital art is nothing new, it's just art. We've been dealing with art for a hundred years."

Aurelia: Yeah, totally.

Richard: Then come all their idiotic ideas, and stupid mistakes.

Aurelia: In relation to that, and also a little bit more on the curation side, how do you feel about...I think I put this in the Google Doc too, or the Pirate Pad, about new approaches to galleries to curating your own collection, so like Artsy, what they're doing for creating these algorithms to help you discover art, and S[edition] is trying to sell you digital art. Those are different, more market-driven approaches, but they kind of do touch on to that idea of community. Do you feel like conservation will go in that direction of having these online galleries that incorporate the latest technologies and algorithms to help you approach? Do you think it will be a crowd-sourced effort in the future?

Richard: Well, it could be and should be, whether it will be, I don't know, because again, we're talking about museums. [laughs]

Aurelia: Yeah.

Richard: Right, and museums have come a long way over the last 60 years. **I wouldn't say the museums are not community driven, but conservation in museums is not community driven**, right?

Aurelia: Yeah.

Richard: A lot of museums are...whatever, Brooklyn crowd-sources stuff all the time. In terms of exhibitions and public programs, and community programs, there's a lot more going on, so there's that, but that mentality hasn't seeped back into the vault yet. It's out in front, it's out in the public galleries, it's in the lecture hall, and the screening room, but it hasn't pushed its way back yet. Perhaps for good reason, because really, how are you going to crowd source the conservation of a renaissance oil painting? I guess you could put questions out there, but you're definitely not going to let people just come in and try it out, right?

Aurelia: Yeah. Do you think he just lack the precedent in how they've approached previous media, and so they don't adopt it, because other groups, as you well know I'm sure, do crowd source. Like code stuff, you can look up on Slash, up online, somebody has had this problem before and they've crowd sourced the solution. I don't think though that there is a community...there our listservs, but there are not really community conservation...there's not a platform for that currently that's formal, and vetted, and isn't just like a string of email that you get on some conserve-disk list, or something that's supposed to help you.

Richard: Yeah, I think that the American Institute of Conservation, which is the professional group for those people, the conservators, they do have a sub group now, the EMG, electronic media group. I do think, if anything, that's a very formal, official, professional attempt to deal with this stuff. There may be more of that, but you're exactly right. I can see where you're sort of

headed toward, and I agree, and we both argue that in the book too, that there needs to be more crowd sourcing that comes to the conservation of digital art, not only because it's new, and we don't trust that 20 conservators in the country already know what to do. We need more brains in the pod. We need to sort of group mind think about it. But also because, as you say, it's a model that grew up around digital media in general, and so we know it works in other fields, so why not do it here? But the thing I would add to that is, can crowd source the...or you can at least share, let's just say, the preservation of digital art in a way that you cannot with the oil painting.

Because with the oil painting you can ask questions, and you can get a consensus, or input on approaches, but then really it's only one institution that's going to control the actual preservation. They're not going to let everybody else in. With digital art you can do both. You cannot only ask what other people's ideas are, you can say, "Here's the digital object, why don't some other people try and preserve it?"

Why is one museum the only one in the world that has to be responsible for preserving this thing, when we have no history of preserving it? So if they fail, it's catastrophic in the sense that the work is lost, and we know that with digital anything, the better thing to do is spread it out there as far as possible, the more copies exist, the more it has a chance of surviving. I don't just mean like a museum collects something, they should simply just cast it out into the world and see what happens, I think that would be interesting, but I also mean that they shouldn't force the artist into exclusive contracts.

When a museum collects something, right now it usually comes with an exclusive contract that says, "OK, we're going to pay you...Mark Napier, were going to pay you $20,000 for NetFlag or whatever, but you're going to have to sign the contract saying you are not going to turn around and sell the same thing to the Whitney and the [indecipherable 24:21] , and everybody else too." Again, it's that history that you have to unpack like, "We need them not to do these exclusive contracts because then it limits the number of copies, which is bad for preservation."

OK, well now we need them back, why they do that? Why are museums doing these...and this is what I mean by "the stupid mistakes," why are they trying to get artist to treat media art as if it was a one-of-a-kind golden sculpture or something? It's not, and it goes against preservation to treat it that way. But there's a history of why they do it that way, and then they compete based on their collection. It's a large part of the reason why MOMA is one of the most famous museums in the world.

It's the collection. It's the fact that they have that collection and nobody else does, so there's very important reasons why it's that way. But nonetheless, this is one of the things we need to change the mindset of, so it's not only sort of open sourcing the work to the public at large, but even other institutions.

Why not say to the artist, "Why not enter **into coalitions of collecting**?" Or why not just tell the artist, "Yeah, sell us copy, we really value the work, we want to collect it, we think it's important, and then go ahead and sell as many other copies as you can too, because you'll get more money, and the work will be better preserved, and we all win."

Aurelia: Yeah, I think I saw briefly on the Tate site, because they have a pretty nice conservation description of how they've approached it to this point, but they kind of crowd purchased a couple of pieces as pilots, so they did a partnership with the Whitney and some other institution, I don't remember which, to diffuse the cost of a work by...but I don't know if that really benefits the artist as much as they are only allowed to charge one price for three different museums that share it. Ostensibly, all three will attempt to conserve it, and **lots of copies keeps us safe**, and that's

really nice, and it will be spread across three institutions. But I'm curious too based on what you just said about no exclusive contracts, and how how this crowd purchase might operate. Who do you think conservators should look to, I guess, for models of how they should approach conservation from now on? Should they look to the way the art market works, and the way galleries to purchase art, or how artists are conserving themselves?

Who do you think will be the source of their...or how the Internet works, and how people share information online, and crowd source, who do you think they'll draw on for inspiration, or who should they, who should be the models of that? If that makes sense, sorry, that was kind of a...

Richard: It does make sense. I'm wondering...Well certainly, they should not look exclusively to the past history of the commercial gallery system and the museums.

Aurelia: OK.

Richard: The way that has work traditionally is not going to be a good model exclusively. You know what I mean?

Aurelia: Yeah.

Richard: There's some good stuff to get from that, but yeah, the other stuff is going to be necessary. I think frankly, a lot of digital DIY culture, and Internet culture, is going to be in place where they're going to want to look. In particular, games, video games, for lack of a better word.

Aurelia: Yeah, totally.

Richard: **Gaming culture, where in some cases games are preserved primarily by a particular fan base**, and there is no institution behind it.

Aurelia: Yeah, totally.

Richard: That's really interesting to look at, because I'm not saying that museums should just excuse themselves from collecting the stuff, and back out of any responsibility. But maybe they could tap into these kind of parallel fan bases of people to help them preserve the stuff in just the way that we were talking about.

Aurelia: Yeah, I think too, I remember...and I think I put this in the Google Doc to, but I remember you speaking about how variability is kind of a necessary...and this is just a horrible paraphrase, so maybe you can correct me too, I might be wrong. But I think I remember you saying that variability was sort of a necessary aspect of new media and conservators develop their own recipes and frameworks without really prescriptives, and maybe that's because they lack some authoritative source or textbook that kind of introduces these methodologies. But how do you think that relates to remix and sampling as trends in the art world? I think I stated that way in the doc, but I'm interested in it in particular because that's part of one of the approaches that I use for, particularly the sound artists, and how reactive and interactive his installations are. He does a lot of remix, and he samples from other artists too, so I'm wondering if that might be a mental model for how conservation might be approached from now on as like sampling from other people's recipes and...if that makes sense?

Richard: Yeah, well I think...as much as I bash museums, there's really a role for them too, but they just need to open up their thinking a little bit, because yeah, a lot of works are going to come to them as mash ups, and remixes, and contain lots of different sources, and they're going to have

to contend with that in a way that they didn't before. They think that they've dealt with it before, because they think, "Oh, we've already done this, we have all this pop art that has all of these cartoons pasted into the canvas," and stuff like that. But it's a whole other level of integration. It's like I think one of the things that I mentioned in the book says there's a difference between appropriation and remix. As mostly visual art that has drawn on, say, popular culture for instance, has standards for appropriating images. You know?

Aurelia: Yeah.

Richard: You take an image, you take a reproduction of the Mona Lisa and you draw a mustache on it or something like that, your appropriating the image, but you're not actually incorporating the materiality of the Mona Lisa into your work. There's a line there, whereas of course, as you know for the remix, you are. You are appropriating some aspect of the source work, and some of its original materiality, the actual code. There's a whole qualitative level of difference in what happens there. Coming into the collection that's going to matter for museums, but also I think what you're hinting at is, could museums, even then after they collect something, could they allow these works to be further...become source material for something else...

Aurelia: Yeah, exactly, yeah.

Richard: ...for another kind of cultural remixes? I think it's something they haven't thought about, because again, most...the art world can be pretty damn arrogant... [laughter]

Richard: ...and think that they've done it all before, and this is one area in which I think they think they've done it all before. It's like, "Well yeah, we know that we're the MET, and we know that we have this famous painting, and we know that a lot of other artists are going to incorporate that into their work, that's all good." What they don't know is, with the digital stuff, the artist don't just want to look at pictures of Mark Napier's NetFlag, and reuse that their work, they want access to the code, and that's different. The conservation office is suddenly it's like it's not enough to put a representation of the work online and see what some other kooky artists are going to do with it, they have to think, "Oh, oh, we're not only conserving it, but were supposed to upload a portion of our collection online for people to download?"

Aurelia: Yeah.

Richard: This kind of goes against their thinking. But of course they should be doing that for so many reasons. It's how that art can be used, there's an opportunity that didn't exist in the past just by an accident of material. The fact that it's digital, and you can copy it, means that culturally it can be used differently. Museums need to maybe think a little bit more like libraries in that sense, let people check stuff out and take it home and do what they're going to do with it...

Aurelia: Yeah, totally. To that point...

Richard: ...and a lot of other reasons. Maybe that was a little bit sideways to your question, but...

Aurelia: No, no, no, that's perfect. Actually it segues into the next one I was going to ask about what you feel like is the most prophetic approach to how people are going to be conserving, do you think it's going to go more the archiving route, where they're just trying to preserve copies of things, or do you think it's going to go more the conservation route where they're actually migrating, and emulating, and changing the format? I think it will depend, of course, on the particular art media. I was talking to a curator at the Whitney a while ago, and she was saying that

her concern is that a lot of...in migration, or emulation, which I'm sure is something you dealt with in Double Take? Was that the show at...?

Richard: Seeing Double, yeah

Aurelia: Yes, sorry, **Seeing Double, which was showing emulated versions of art works next to their originals**, but she was worried about the homogenization in conserving, and how when she converts something to a new format so they can continue to run it that it loses all of its individuality, and all of the particularities of its original media. Do you think there's going to be a...

Richard: Yeah, there are a lot of concerns around...Well, there's the two approaches...What I find is interesting is it's...the practice doesn't really fall into either of those, because there's one...wait, what did you call that one? The preservation, where you're just observing the original files?

Aurelia: Like the archiving one versus the conserving, yeah.

Richard: Yeah, yeah, OK. There is that approach, that's what museums cleave to most naturally. They all admit that they have to do a little touchup painting on the old master painting every once in a while, but a very, very small degree of change to the work in order to preserve it, so that's what they cleave to. But with the preservation approach, which I think is natural to museums because the historicity of the work is maintained, in their minds the intellectual and artistic integrity of the work is maintained because you're keeping quote/unquote, "to the original." There are many things wrong with that, not least of which is that, "OK, you may take that route, and consigned network to a very early death." Because guess what? HyperCard software running on a Mac SE is not going to work for the next 50 years, and the next hundred years. Really, if you think you're going to just plug that machine in the wall and just keep that precious little copy of HyperCard running so you can run that artwork, doomed, doomed approach, dumb.

Aurelia: [laughs]

Richard: That's the preservation approach, right?

Aurelia: Yeah.

Richard: Where you just try and keep the thing unto itself. I understand the concerns about endless unregulated emulation and simulation and re-creating the code from scratch, and all this kind of stuff. But if you just go too far in that direction the work dissolves. Well, essentially the boundaries of the work, and authorial thing that is the work dissolves such that it becomes not the work anymore, right?

Aurelia: Mm-hmm.

Richard: After a certain amount of remakes, the work that you're then exhibiting becomes really a remix of the original work, and not the original work. Where the original work is just one of the sources maybe that was sampled, or something like that. Then you have a new thing with new authorship, and museums don't necessarily want exhibit that. Now that's an interesting prospect, territorially, for an exhibition, but I can see why there's a worry about it in terms of the collection. You collected this thing by Mark Napier because you thought that was important, and that artist was important at this moment in time, not just simply as some kind of fodder for a digital

mash-up a hundred years in the future. I can see the concerns around that, but you have to aim somewhere in between those two extremes, right?

Aurelia: Yeah.

Richard: Because one, with too much prescription the work will die early, and with too few parameters the work will just dissolve into not being the work anymore. I think you can aim in between, and this is of course where everybody in reality is what they're doing. **What I'm finding though is that museums that claim that they're doing preservation are actually not, they're slipping**. There...you know, when it came in as a film, they're exhibiting it as on a DVD, but the wall label still says "film, Theresa Cha, moving image, 16mm film," and the audience is standing there looking at it DVD. That's kind of happening in conservation to, then Museum will collect a CD-ROM authored on whatever ancient Macromedia product that was offered on and the Museum says, we're preserving those files."

"We are preserving, that's what we're doing. We're not going to go you're crazy route of this emulation and all this nuts stuff," and so they're like, "Preserve those files, and we are going to write an emulator, we're going to write an emulator, that's what we're going to do."

Then the emulator will run on the current computer, and it will then run the old CD-ROM software, and that's preservation, and it sounds like such a pure stance, but in reality you changed everything. It's not a disk anymore, it's not this little shiny disc that you pull out of the sleeve with the little colorings on it, and you stick it into a slot, and you do this. It's not that kind of noble, portable media anymore.

You've stuck it onto a hard drive, and the machine that you're playing it on is certainly different, it's some kind of big iMac, or something like that you're playing it on, instead of the old whatever the CD-ROM was playing on originally, some old Windows 1.0 computer.

Aurelia: [laughs]

Richard: Yeah, you've preserved the original files, and you're running them through emulation, and I agree for that work, that might be exactly what you want to do, but you have to cop to the fact that you're not preserving it, your conserving it at that point, you're making some changes, and here's where my problem is with that. Those are usually unguided decisions, they are usually just, "Well, this is what we're doing, we think we're going to call it preservation, and this is the pure route." Well it's not, but you're not copping to that, and how do you know that that's OK for that work? In the future, when you have to do more than emulation, or more levels of emulation, or whatever it's going to take, how do you know that that's OK?

Aurelia: Yeah.

Richard: Of course **what Jon and I propose in the book is, you have to ask when you collected a work. That's why you need to create metadata that tells future conservators what the parameters are for re-creating the work, what's allowed to change, by how much, and in which ways, and what is not allowed to change, and that is triangulated between hopefully the artist, when they're living, you get them to talk about it, conservators, co producers, even audience members who triangulate all that between them, hopefully getting as much as you can from the original artist.** Then you have a recipe for recreating it in the future, so that when you do take it off of the original medium, media format, and you do perform it on a different kind of a CPU, with a different screen, you have some guidelines about how to do that.

Aurelia: That totally makes sense.

Richard: I think that a lot of museums say that they're doing preservation, but they're not, they're fudging it.

Aurelia: [laughs] Just a couple more questions, sort of taking off that, do you think there's more of an appetite for preservation with new media then there is... Or is there more apathy, do people recognize that this is a problem outside of the museum world, do you think that the museums are more interested in preserving these fugitive formats, and they're putting more emphasis on it because previous media had conservation departments, and they feel like they just haven't prepped for this enough, or do you think they're excited about it, or they're making more of an effort, or do you think they're just kind of fumbling and failing?

Richard: Well, that's a good question, and it sort of brings up that we both have been talking about, and I've been talking about museums this or that, but there is no one museum, there is no one body or identity that is all that, so what I find is there's a mixture of reactions. One very widespread reaction is that collecting organizations are just scared of this stuff, and they're not collecting it. There really aren't that many if you add them up. They got there are a few, but there something like 10,000 museums in the US and trust me they're not all collecting digital anything. Most are scared. It's kind of funny that those that aren't tend to be the big ones, and that's another question I have too is, if only the largest museums can hire a digital conservation specialist that gives them the courage to collect digital stuff that, unlike a painting where any little tiny Podunk museum that gets enough money can start to collect paintings, and they do, we do I should say.

But are only the biggest five museums in the country going to be able to click digital art? Then what does that do history, if there's really only five curators in the whole country that are deciding what's important for the future...**In that sense, does a logistical concern, being able to have the expertise to have the courage to collect it, drive how we write history, how we're going to remember this period of history**?

Aurelia: Yeah.

Richard: I see a fear of collecting it, that's one stance, and those museums aren't in the conversation because they're just not collecting it. Outside of the museum field I actually see a lot of serious attention being given to this, especially from the library field, so no, I think culture is waking up to the fact that we have a lot of our culture is now digital, not just art, but government records, personal documents, home movies, all of your home photographs, presidential campaign websites, employee records, at-large employers. Everybody is getting now that our culture has turned largely digital, and they're trying to figure out how to preserve it, so then back to the museum world. There is the fear on the one hand, in terms of negative reactions there's also a hubris like I sort of mentioned before that, "Well, you know, we know about collecting art, and we've been collecting video art, how different can this be? We have a media conservation department, they can deal with this, it's just like video, right?" Of course it's not.

Aurelia: Oh, OK.

Richard: There's a little bit of the arrogance, and then also in the museum world I think there is some serious, serious museums that are collecting this stuff because it's important, and they're hiring people with the proper skills because they know that's going to be necessary to preserve the work, and they're doing the best they can.

Aurelia: OK, so what do you think...what is their goal? Or what is your goal in preserving the media? Are we preserving it for posterity, preserving it for the artist, because some of them are still living but I guess they won't be forever, I guess what is the immediate goal for preserving? Are people trying to take captures of lots of different media types so that they have one of everything? Is it the, "two-by-two like Ark," idea [laughs] that, "We have two copies of this type of art, and were going to preserve those two, and those are going to be our flagship examples," or what's the goal I guess?

Richard: Well those are methods you were talking about at the very end which is...different museums, and that's really a collecting strategy, not a preservation strategy. A Museum is going to say, "Yes, we'll either be an encyclopedic museum and we'll collect samples, exemplary samples, of different nuanced movements within our range of collecting," and then there are others that are going to be incredibly focused on a single artist. A Museum, the Andy Warhol Museum, or whatever worries about a single artist, or a single period in time. But the goals of collecting digital art, now this is where it is the same, the goals for collecting digital art are the same as the goals for collecting any kind of art, to preserve it for posterity, to make it available as a resource for research, so the future researchers can come into the collection and figure out what was going on in the past, and how the past has influenced the present, and et cetera, et cetera, and to be able to bring the work out again for aesthetic engagement.

I would say those two purposes, you're preserving the work of art so that you can make it available to the researcher, and so that you can exhibit it in the future.

Aurelia: OK. When you worked on Seeing Double, what was your primary goal for that project?

Richard: I didn't curate Seeing Double.

Aurelia: Oh, I thought you...well you advised on it didn't you?

Richard: No, no, I was involved in it, but I didn't curate it. That was the show at the Guggenheim and that was curated...I want to say it was Jon Ippolito, whose co-authoring my book. He was the associate curator for media art at the Guggenheim, and I know he put the show together. I don't know whether he curated it or not, but anyway, he'd be the resource on that one.

But what they wanted to do in putting that together, I was part of the group at least that talked about it, is to sort of take all of these issues we've been talking about, because...let's see, a lot of these wonderful debates about the reproducibility of art, and the dematerialization of the art object, and all of these great ideas about contemporary art that have kind of expanded our notions of what art is, tend to happen in the front of house in museums, they happen around exhibitions. They rarely get into the back of house, into the collections, which is in the vault, and there's a lot less theory that happens back there, it's a lot more practical knowledge. In turn, also what happens back there tends not to get back out into the public realm that much. Sometimes it does, sometimes a museum will show a work that's been conserved, and then talk about the conservation, but it tends not to get out there like that.

What the Guggenheim wanted to do was to say, **"There are these really interesting issues around conserving digital art that bring up all sorts of issues, what is the art object? What is an author? All this kind of stuff, and we're just discussing it between ourselves at the professional level, in our little professional journals, and at our conferences. Let's let the public in on this discussion too. This is kind of interesting stuff."**

That was the reason they held it, and specifically they wanted to use the public as focus group so that they could try out the preservation methodology and say, "Well here's the original one that we still have working, here's an original copy of the work, and then here's a copy of the work that we've recreated through some means, through either emulation, or entirely recreating it from the ground up..."

"...or using the original files as source, and we're going to exhibit those two copies next to each other and let the public sort of be the barometer of, 'Well, are we conserving it?' 'Isn't this the same work?' Or, have we fallen prey to our own fears that the work that we think were conserving, actually diluting?"

Aurelia: OK, that seems to kind of align with your writing objective, aside from the emulation focus, for the book that you're going to publish. Do you see that as a precursor to the thought processes, and how you were thinking about the separation between what goes on in conservation, and what goes on in just the greater world, and what curators are thinking about, and collectors are thinking about? Do you see this as the connective tissue between those environments, as that exhibit was?

Richard: Yeah, another way to put it is that Jon and I were both involved in that exhibition, which was in part funded by a grant that I wrote from the Berkeley Art Museum, it was funded by the NEA, it was a grant project called "Archiving the Avant-garde." I got a bunch of people together, including the Berkeley Art Museum, the Guggenheim Museum, and a bunch of others. We went in together on this grant, we got the funding, I was the grant manager. Part of that funding for the Guggenheim went toward that exhibition, and then their report at the end went into the grant report, and that grant, and that exhibition, were part of a series of projects of projects that have gone on in the last 15 years around preserving digital art. Some of which have involved the same people, i.e. me and Jon, so when we were writing this book, yes absolutely. **This book is, in a way, the culmination of a lot of those projects.**

Aurelia: Was the exhibit successful?

Richard: It was successful, in the sense that it engaged the public in talking through these issues, and in their judging about whether or not these works were the same. There was also a public program called...what was that called? "Preserving the immaterial," there was a public, sort of half-day, symposium at the Guggenheim on the topic during the show. That produced a lot of new knowledge, so yeah, the goals were met of putting these issues out in front of the public, and then generating this kind of larger discussion around the topic.

Aurelia: One last question, and I think I put this in the dock too, but I kind of had a question, "Looking forward, what do you see as the next new media challenge?" I guess, or do you think it's going to be something related to this fusion, or remix, or a collective authorship that seems to be pretty common on the Internet and in other... Not to the outside of the art world even, but just in how we crowd source and ask questions on Quora, and expect that everyone will participate, and there's this sort of social good imperative to contributing to Wikipedia. Do you think it's going to be those kind of collective works that are the new challenge, or what do you think is going to be the most difficult thing for museums to...?

Richard: Well, those works already are...those are already the ones that museums are collecting, so that's not any kind of new challenge. There is no one challenge. There's going to be challenges on lots of fronts, like for instance the technical challenges of preserving some of the original digital stuff is just one tiny thread among many. The other is, as you said, changing the institutional mindsets around crowd sourcing, museum collections, that's not really an idea that

has been out there that long. But if I can answer what I think you're asking, it would be...there would be two different answers. One would be, were at the era where were just beginning to see the first professional, digital art conservators. You know?

Aurelia: Yes.

Richard: People who actually are trained, like you said, both in to some degree, computer science, and conservation science, from a museum standpoint, and who are getting hired by museums. Because up until now it's been people like me, I'm not a conservator, do you know what I mean? I didn't work in the conservation department. I headed the digital media department, I am a curator. I'm now a Museum director. Do you know what I mean?

Aurelia: Yeah.

Richard: Jon Ippolito, he was the media curator at the Guggenheim, he was not a conservator, so it's been people like us, because who else was there? Somebody needed to raise the alarm and start the investigation, and also there weren't really the training programs. Museum studies and conservation programs around the country weren't...still to a large extent, aren't turning out these...they don't have the program to professionalize the field. That's changing, so now we're seeing slowly, Masters Programs in conservation and Museum studies are incorporating digital, and so you're getting more people coming out of them who are trained. Very few, and like I said before, only the biggest museums, like MOMA's a good example, have slowly begun to hire conservators who are specifically digital conservators. That's one shift that I think we're seeing right now. The field is professionalizing, which I think is 98 percent a good thing.

Aurelia: [laughs]

Richard: That's exactly what we need, people with the right skills and training in the conservation department doing their thing. The only reason I...the only two percent that I leave is...that little two percent of hesitation is, I hope that in doing that, those institutions don't just fall back on their past practices. I hope they don't think, "Oh, we've got it down, just going to do this." But largely that's a good thing, the other...and this is much more speculative, the other answer would be, I think bio art is going to be a real challenge. [laughs]

Aurelia: Yeah, portions of my thesis is this last part about...A friend of mine, she collects biological samples from the subway, and then generates a genetic profile, and synthesizes DNA from that, and from there prints a 3-D model of people's faces based on...so her work incorporates lots of code, and then all of the DNA synthesis and science research that she does around that, and then also just the organic samples. Conserving all of that as a package is going to be a whole new suite of challenges...

Richard: Exactly.

Aurelia: ...so I'm glad you said that actually, [laughs] because I feel like that portion is somewhat legitimized. It feels like it's a departure from rest of what I'm treating, but I think it's a really important form.

Richard: Well, it's highly speculative, so as an advisor I can almost see if I had someone, if I was advising someone, I might even counsel them, "You know what? Stick to this stuff, leave the bio art, because it's so speculative and new that you're not going to find any good research material on it..."

Aurelia: True.

Richard: "...and thus, you'll probably not be able to say anything great about it." It's not a bad idea, but on the other hand, it might be good to leave in there in some sort of sense like, "OK, this is on the horizon, not a lot out there."

Aurelia: Well I definitely think it does fit with the idea that we're going to be producing this new breed of conservator that kind of requires that dual competency in both traditional conservation...

Richard: Yeah.

Aurelia: ...so chemical stuff, and dealing with biomaterials, and then also the digital. Understanding how to read the code, or at least how to wrap it in some metadata that makes sense to people who do know what the language is it's written in, and can deal with it later.

Richard: Yeah.

Aurelia: Great.

Richard: Yeah it is, it's definitely...that one kind of scares me. [laughter]

Aurelia: Yes totally, it's a scary space.

.: BIBLIOGRAPHY :.

Albrethsen, Pernille. "Platform Formalism." NU-E__FROM: *The Nordic Art Review*, April 16, 2004. Accessed on August 10, 2012. http://www.nu-e.nu/nue.asp.

Amerika, Mark. *Meta/Data: A digital poetics*. Cambridge, Mass: The MIT Press, 2007.

Arcangel, Cory. "Everybody Else." In *Digital Folklore*, Olia Lialina + Dragon Espenschied eds, 7-8. Merz + Solitude, 2009.

Arns, Inke. "Read_me, run_me, execute_me: Software and Its Discontents, or: It's the Permativity of Code, Stupid." Last modified 2004. http://www.runme.org/. Runme.org. Accessed August 15, 2012.

Ascott, Roy. "Is there love in the telematic embrace?" *Computers and Art: Issues of Content. Art Journal* 49:3 (Fall, 2006): 241-247. *Art Full Text* (*H.W. Wilson*), EBSCOhost. Accessed March 24, 2013.

Bailey, Charles W. "Strong Copyright + DRM + Weak Net Neutrality = Digital Dystopia?" *Information Technology and Libraries*. 25:3 (2006): 116-127. Accessed May 8, 2012. http://digital-scholarship.com/cwb/ital25n3.pdf.

Battles, Matthew. "Knowledge is a property of the network: Mapping Britannica's world in a Wikipedia age." *Nieman Journalism Lab*, March 20, 2012. Accessed March 23, 2012. http://www.niemanlab.org/2012/03/knowledge-is-a-property-of-the-network-mapping-britannicas-world-in-a-wikipedia-age/.

Baudrillard, Jean. "For a Critique of the Political Economy of the Sign." Trans. Charles Levin. The New Media Reader, 278-288. Noah Wardrup Fruin and Nick Montfort, eds. Cambridge, Mass: MIT Press, 2003. From the French "*Pour une critique de l'économie politique du signe*."

Baumgartel, Tilman. "Net Art: On the History of Artisitc Work with Telecommunications Media." In *net_condition: art and global media*, ed. Peter Weibel and Timothy Druckrey. Cambridge, Mass: MIT Press, 2000.

_____. [Net.art 2.0]: Neue Materialien Zur Netzkunst/New Materials Towards Net Art. Nürnberg: Institute für Moderne Kunst, 2002.

Bell, S.C.D. "Participatory Art and Computers: Identifying, Analyzing, and Composing the Characteristics of Works of Participatory Art that Use Computer Technology." Ph.D. diss., Loughborough University, 1991.

Berners-Lee, Tim. *Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web*. San Francisco: Harper Collins, 1999.

Berners-Lee, Tim, James Hendler, and Ora Lassila. "The Semantic Web." *Scientific American Magazine*, May 18, 2001. Accessed August 10, 2012. http://www.scientificamerican.com/article.cfm?id=the-semantic-web-overview.

Blank, Joachim. "What is Netart ;-) ?" Presentation at the exhibition *(History of) Mailart in Eastern Europe* in the Staatlihes Museum, Schwerin, Germany, 1996. Accessed on March 15,

2013. at http://www.irational.org/cern/netart.txt.

Boudrias, Émilie, Alezandre Mingarelli, and Olfa Driss. "A Preservation Guide for Technology-Based Artworks." *DOCAM*. Accessed March 15, 2013. http://www.docam.ca/en/about-cons.html.

Bourriaud, Nicholas. *Esthétique Relationnelle*. Dijon: Presses du reel, 1998.

_____. *Postproduction: Culture as Screenplay: How Art Reprograms the World*. New York: Lukas & Sternberg, 2002. Accessed March 15, 2012. http://www9.georgetown.edu/faculty/irvinem/theory/Bourriaud-Postproduction2.pdf.

Buerger, Manuel, Dragan Espenschied, and Olia Lialina. *Digital Folklore*. Stuttgart: Merz & Solitude, 2009.

Burnham, Jack. "Systems Esthetics." *Artforum* 7:1 (September): 30-35, 1968.

_____. "Art and Technology: The Panacea That Failed." In Kathleen Woodward, ed., *The Myths of Information: Technology and Post-industrial Culture*, 205-215. Bloomington: Indiana University Press, 1980.

Burreaud, Annick, "Mouchette." *Art Press* (May 2000): 90. *Art Full Text*.. Accessed 20 Oct. 2010, 1.

Bush, Vannevar. "As We May Think." *The Atlantic Monthly Group* (July 1, 1945). Accessed January 10, 2011. http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/.

Candeira, Javier. "Towards a Permanently Temporary Software Art Factory." *Readme 100* Commission. Dortmund, 2005. Modified February 15, 2006. Accessed March 15, 2012. http://runme.org/feature/read/+sustainability/+109/.

Ceruzzi, Paul E. *Computing: A Concise History*. Cambridge: The MIT Press, 2012.

Charans, Eleonora. "Quelles archives pour la video?" *Art-Press* no. 382 (October 2011): 58-61. *Art Full Text* ( ), EBSCOhost. Accessed March 20, 2013.

"Cherubs and computer-geeks." *The Economist* [US] 15 Aug. 1992: 75+. *Academic OneFile*. Accessed 14 Mar. 2011.

Coghlan, Andy. "Computer simulates paintings on the move." *New Scientist 131.1787*, 28, 21 September 1991. Accessed March 10, 2013. http://www.newscientist.com/article/mg13117874.100-technology-computer-simulates-paintings-on-the-move-.html.

Coleman, E. Gabriella. "Coding Freedom: The Ethics and Asethetic of Hacking." Princeton: Princeton University Press, 2013. Accessed February 15, 2013. http://gabriellacoleman.org/Coleman-Coding-Freedom.pdf.

Cornell University Library. *Digital Preservation Management: Implementing Short-term Strategies for Long-term Problems* (2007). Extended and maintained by the MIT Libraries (2012+). Accessed December 10, 2012. http://www.dpworkshop.org/.

Cornock, Stroud, and Earnest Edmonds. "The Creative Process Where the Artist is Amplified or Superseded by the Computer." *Leonardo* 6 (11): 11-15 (1973).

Cox, Geoff. *Speaking Code: Coding as aesthetic and Political Expression*. Cambridge, Mass: MIT Press, 2013.

Critical Art Ensemble. "Nomadic Power and Cultural Resistance." *The Electronic Disturbance*, 11-30. New York: Automnomedia, 1994.

Cummings, Neil, and Marysia Lewandowska, extract, "From Enthusiasms to Creative Commons", email exchange with Anthony Spira, Enthusiasm: Films of Love Longing and Labour (London: Whitechapel Gallery/Berlin: Kunst werke/Barcelona: Tàpies Foundation, 1 April 2005-15 January 2006. This text is licensed under Creative Commons: Attribution NonCommercial ShareAlike. http://wwwcreativecommons.org.

Daniels, Dieter. *Kunst als Sendungz*: Von der Telegrafie zum Internet. Munich: Beck, 2002.

_____, "Media ? Art / Art ? Media: Forefrunners of media art in the first half of the twentieth century." *Medien Kunst Netz* (2004). Accessed March 29, 2013. http://www.medienkunstnetz.de/themes/overview_of_media_art/forerunners/.

Dawsey, Josh. "Art Emerges from DNA Left Behind." *Online Wall Street Journal*, March 10, 2013. Accessed March 12, 2013. http://online.wsj.com/article/SB10001424127887324281004578352473833386586.html?mod=WSJ_NY_MIDDLETopStories.

Dekker, Annet. "In Search of the Unexpected." Navigating e-Cultures. *Interview with Martine Neddam*. Virtueel Platform. Amsterdam, Netherlands, 2009.

Deleuze, Gilles, and Félix Guattari. *A thousand plateaus: capitalism and schizophrenia*, Brian Massumi, trans. Minneapolis: University of Minnesota Press, 1987.

De Montjoye, Yves-Alexandre, César A. Hidalgo, Michael Verleysen, and Vincent D. Blondel. "Unique in the Crowd: The privacy bounds of human mobility." *Scientific Reports* 3:1376 (March 25, 2013). Accessed March 29, 2013. DOI: 10:1038/srep01376.

Depocas, Alain. Digital preservation: recording the recoding – the documentary strategy. Accessed June 30, 2011. http://www.fondation-langlois.org/html/e/page.php?NumPage=152.

_____, Jon Ippolito, and Caitlin Jones, eds. "Permanence Through Change: The Variable Media Approach." *Variable Media Network*. New York: Guggenheim Museum, 2003. Accessed on January 10, 2012. http://www.variablemedia.net/e/preserving/html/var_pub_index.html.

Derrida, Jacques. *Archive fever: a Freudian impression*. Chicago: University of Chicago Press, 1996.

Dietz, Steve. "beyond.interface: net art and Art on the Net II." A paper presented for the *Museums and the Web Conference 1998*. Accessed March 29, 2012. http://www.walkerart.org/archive/5/B6739D30749AE5106165.htm?&src1=../D/BD739D0875D453566164.htm&target1=right.

De Ruyter, Tibaut. "Volume minimal, un art de la projection du son / Sound Art, Minimal Elements." *Art Press* 315 (2005)

Dewey-Hagbourg, Heather. "Stranger Visions." Accessed March 15, 2013. http://strangervisions.com/about.html.

Diamond, Sarah. "Participation, Flow, and the Redistribution of Authorship: The Challenges of Collaborative Exchange and New Media Curatorial Practice." In Christiane Paul, ed., *New Media in the White Cube and Beyond: Curatorial Models for Digital Art*, 135-162. Berkeley and Los Angeles: University of California Press, 2008.

Drutt, Matthew. *Guggenheim Museum--Virtual Museum*. Guggenheim Museum Press (1999). Retrieved from http://www.guggenheim.org/exhibitions/virtual/virtual_museum.html.

Dunshire, Gordon. "Web Resource Management and Semantic Web." 8th International CALIBER -2011, Goa Univserity, Goa, March 02-04, 2011. Ahmadabad: INFLIBNET Centre. Accessed on October 29th, 2012. http://shodhganga.inflibnet.ac.in/dxml/handle/1944/1605.

Edwards, David. *ArtScience: Creativity in the Post-Google Generation*. Cambridge, Mass: Harvard University Press, 2008.

Enzesberger, Hans Magnus. "Constitutents of a Theory of the Media." *New Left Review* 64 (Nov/Dec 1970): 13-36. Reprinted in *The Consciousness Industry*, trans. Stuart Hood. New York: Seabury Press, 1974.

Ernst, Wolfgang. "Dis/continuities: Does the archive become metaphorical in multi-media space?" In Wendy Hui Kyong Chun & Thomas Keenan (Eds.), *New media old media: A history and theory reader* (pp. 105-123), New York: Taylor and Francis Group, 2006.

Fayet-Scribe, S. *Histoire de la documentation en France: Culture, science, et technologie de l'information, 1895-1937* (CNRS histoire). Paris: CNRS, 2000.

Featherstone, M. "Archiving cultures." *British Journal of Sociology*, 5:1 (2000).

Fetterly, D. , Manasse, M., Najork, M. & Wiener, J. (2003). A large-scale study of the evolution of web pages, Budapest, Hungary. Accessed March 23, 2013. http://research.microsoft.com/pubs/73808/p97-fetterly.pdf.

Fino-Radin, Ben. "Digital Preservation Practices and the Rhizome Artbase." Rhizome.org (2011). Accessed June 30, 2011. http://rhizome.org/editorial/2011/aug/5/keeping-it-online/.

Forging the Future. "Forging the Future: New Tools for Variable Media Preservation (2011)." Accessed June 30, 2011. http://forging-the-future.net/#overview.

Foster, Hal. "An Archival Impulse" *October* 110. Cambridge, Mass.: The MIT Press: 3-6; 21-2 (2004).

Fuller, Matthew. "Art Meet Net, Net Meet Art." *Tate Modern* (2000a), http://www.tate.org.uk/intermediaart/entry1568.shtm.

Gablik, Suzy. “Connective Aesthetics: AR after Individualism. “ In Suzanne Lacy, ed., *Mapping the Terrain: New Genre Public Art*, 74-87. Seattle: Bay Press, 1995.

Gere, Charlie. Chapter 1: The Beginnings of Digital Culture. In *Digital Culture*. London: Reaktion, 2002.

_____. “New Media Art.” *Art Book* 21, no. 2 (May 2005): 6-8. *Art Full Text* (*H.W. Wilson*), EBSCOhost (accessed March 24, 2013).

_____ . “The History of Networked Art.” In Tom Corby, ed., *Network Art: Practices and Positions*, 11-23. London: Routledge, 2006b.

Gill, T. “Metadata and the Web.” In M. Baca (ed.), *Introduction to Metadata: Online Edition*, Version 3. Los Angeles: Getty, 2008. Accessed February 15, 2011. http://www.getty.edu/research/publications/electronic _publications/intrometadata/metadata.html.

Gladney, Henry M. “Long-term preservation of digital records: Trustworthy Digital Objects”. *American Archivist*, *72*:2 (2009): 401-435.

Goldberg, Ken, ed. *The Robot in the Garden: Telerobotics and Telepistemology in the Age of the Internet*. Cambridge, MA: MIT Press, 2000.

Graham, Beryl. “A Dialogue with an Idiot? Some Interactive Computer-Based Art.” In Finn Bostad, Craig Brandist, Lars Sigfred Evensen, and Hege Charlotte Faber, eds., Bakhtinian Perspectives on Language and Culture: Meaning in Language, Art and New Media, 217-232. London: Macmillan: 2004.

_____ , and Sarah Cook. *Rethinking Curating: Art After New Media*. Cambridge, Mass.:MIT Press, 2010.

Guattari, Félix. *Les trois ecologies*. Paris: Editions Galilée, 1989.

Harper, Dennis. “Etymological definition of ‘archives (n.).’” *Online Etymology Dictionary*. Accessed March 29, 2013. http://www.etymonline.com/index.php?term=archives&allowed_in_frame=0.

Harris, Mark. “Nam June Paik and the Conservation of Video Sculpture (2011).” Accessed March 10, 2013. http://www.ufva.org/news/nam-june-paik-and-conservation-video-sculpture-symposium-and-exhibition.

Hasegawa, Yuko. “Ryoji Ikeda.” *Sensorium: embodied experience, technology, and contemporary art*, 68-71. Caroline A Jones, ed. Cambridge, Mass.: The MIT Visual Arts Center, 2006.

Helmholtz, Hermann von. *Vorträge und Reden*, Bd. 1. Braunschweig: F. Vieweg, 1884.

Hemment, Drew. “The Locative Dystopia.” *OCLC* (Jan 7, 2004). Accessed March 25, 2013. http://eprints.lancs.ac.uk/30831/1/Locative_Dystopia_2.pdf.

Herbert, Martin. “The Mathematical Sublime.” *Modern Painters* 20.9 (2008)

Irby, James E. and Donald A. Yates, eds. *Labyrinths: Selected Stories and Other Writings By Jorge Luis Borges*. New York: New Directions Publishing, 1962. Accessed March 25, 2013. http://darienbrito.files.wordpress.com/2012/05/labyrinths-and-other-stories.pdf

Jefferson, Curtis and OTW. "Organization for Transformative Works." Modified March 30, 2013. https://transformativeworks.org/.

Jones, Caitlin, and Lizzie Muller. "Between Real and Ideal: Documenting New Media Art." *Leonardo* 41:4 (2008): 418-419.

Judge, Anthony. "Laetus in Praesens: Frequently Asked Questions." Last modified February 19, 2012. Accessed March 10, 2013. http://www.laetusinpraesens.org/bio/faq_laet.php#A1.

Kaganskiy, Julia. "Artist Collects and Analyzes DNA Samples to Create 3D Portraits in 'Stranger Visions.'" The Creators Project, January 24, 2013. Accessed March 10, 2013. http://www.thecreatorsproject.com/blog/artist-collects-and-analyzes-dna-samples-to-create-3d-portraits-in-stranger-visions.

Kahn, Douglas. *Noise, Water, Meat: A History of Voice, Sound and Aurality in the Arts*. Cambridge, Mass.: MIT Press, 1999.

Kelly, Kevin. *Out of Control: The New Biology of Machines, Social Systems, and the Economic World*. Reading, Mass: Addison-Wesley Publishing Company, 1994.

Kenney, A.R. & Sharpe, L. H. with Berger, B, Crowhurst, R. , Ott, M.D. & Quirk, A. Illustrated Book Study: Digital Conversion Requirements of Printed Illustrations (1999). Cornell University Library. Accessed June10, 2012. http://www.library.cornell.edu/preservation/illbk/ibs.htm.

Kopstein, Joshua. "0-Day Art: saving digital art one torrent at a time." *The Verge*, April 23, 2012. Accessed March 25, 2013. http://www.theverge.com/2012/4/23/2961601/0-day-art-digital-art-torrents-piracy.

Kujundzic, Dragan. (2002). "Archigraphia: On the Future of Testimony and the Archive to Come", *Discourse* 25. Michigan: Detroit, Winter: 175-177; 181-183.

Lazzeroni, Claudius, ed. *Generative Design: Visualize, Program, and Create with Processing* by Hartmut Bohnacker, Benedikt Groß, and Julia Laub. New York: Princeton Architectural Press, 2012.

Laforet, Anne. *Net art et institutions artistiques et muséales: Problèmatiques et pratiques de la conservation*. Paris: Ministère de al Culture et de la Communication Délégation aux Arts Plastiques, Bureau de la Recherche et de l'Innovation Université d'Avignon, ,et des Pays de Vaucluse Laboratoire Culture et Commmunication: 2004. Accessed March, 2013. http://www.sakasama.net/conservationnetart.

Levoy, M. & Garcia-Molina, H. "Creating Digital Archives of 3D Artworks." Stanford Univserity Online. Modified February 19, 2006. Accessed March 10, 2013. http://www.graphics.stanford.edu/projects/dli/white-paper/dli.html and http://www.graphics.stanford.edu/projects/mich/.

Lovejoy, Margot. *Digital Currents: Art in the Electronic Age*. 3rd ed. London: Routeledge, 2004.

Lovink, Geert. *Zero comments kernels of critical internet culture*. London: Routeledge, 2008.

_____ . " Theses on Wiki Politics: An exchange with Pavlos Hatzopoulos for Re-public." Retrieved from the Republicart Web site (2007). Accessed April, 10, 2012. http://www.republicart.net/disc/aap/kravagna01_en.htm.

Lyotard, Jean Francois. "Les Immattériaux." In Bruce W. Ferguson, Reesa Greenberg, and Sandy Nairne, eds., *Thinking about Exhibitions*, 159-174. London: Routledge, 1996.

Makrous, Paule, and Marcia Couëlle. "La figure mythique de Mouchette: effet de presence en rituel/ The Mystical figure of Mouchette: Effect of Presence and Ritual." *ETC (Montreal, Quebec)* September/October/November 2007: 13-15, 33-4. *Art Full Text*. Accessed 20 Oct. 2010.

_____. "Le partage sur le Web : personnages virtuels et Web 2.0 selon Martine Neddam /Web sharing: virtual personae and Web 2.0 according to Martine Neddam" .dpi, Revue électronique du StudioXX, Montréal, Canada. Accessed 20 Oct. 2010.

McLuhan, Marshall. "The medium is the message" from *Understanding media: The extensions of man*. New York: McGraw Hill, 1964.

Malina, Roger F. "The Stone Age of the Digital Arts." *Leonardo* 35:5 (2002): 463-465.

Masanès, J. Web Archiving: Issues and Methods. In J. Masanès (Ed.), *Web Archiving*. Berlin: Springer, 2006.

Manovich, Lev. "What is Digital Cinema." manovich.net/digital-cinema.html, 1995. Accessed December 11, 2011.

_____ . "Chapter 5: Database as symbolic form." In *The Language of New Media*. Cambridge, Mass.: MIT Press, 2001.

_____ . "Ten Key Texts on Digital Art: 1970-2000," *Leonardo* 35:5 (2002): 567-576.

_____ . "New media for Borges to HTML." In Noah Wardip-Fruin, & Nick Montfort (Eds.), *The new media reader* (13-25). Cambridge, Mass: The MIT Press, 2003.

_____ . "La forma dell'informazione /The shape of information." *Domus* no. 892 (May 2006): 106-107. *Art Full Text* (*H.W. Wilson*), EBSCO*host* (accessed March 24, 2013).

Merewether, Charles, ed. *The Archive: Documents in Contemporary Art*. Boston: MIT Press + Whitechapel Gallery, 2011.

Michaels, Daniel. "Encyclopedia of World Problems Has a Big One of its Own: Chronicle of Woes From Alien Abductions to Dandruff Finds Itself Short." Online Wall Street Journal, December 11, 2012. Accessed December 28, 2012. http://online.wsj.com/article/SB10001424127887323717004578158742420230924.html.

Milliard, Coline. "Acid Polyphnony." *Modern Painters* 22.2 (2010.

Miranda Zuniga, Ricardo. "The Work of Artists in a Databased Society: Net.Art as Online

Activism." *Afterimage* (March-April, 2002): 7-9.

Murray, Janet. "Inventing the medium." Introduction to *The New media reader*. Noah Wardrup Fruin and Nick Montfort, eds. Cambridge, Mass: MIT Press, 2003.

Neddam, Martine, ed. "*MOUCHETTE *." *mouchette.org*. 1996. Accessed 15 Oct., 2010.

_____. "Martine Neddam, artist: CV Projects and Exhibitions." *http://www.neddam.info*. Accessed 20 Oct. 2010.

Olson, Christopher. "Beautiful, useless things: the work of Ryoji Ikeda." *Border Crossings* 29.1 (2010).

Paul, Christiane. "The Myth of Immateriality: Presenting and Preserving New Media." On Oliver Grau, ed., *MediaArtHistories (*251-274). Cambridge, Mass.: MIT Press, 2007.

_____. Chapter 2: Digital technologies as medium. In *Digital art.* London: Thames and Hudson, 2008.

_____ Challenges for a ubiquitous museum: From the white cube to the black box and beyond. In Christiane Paul (Ed). *New media in the white cube and beyond: Curatorial models for digital art* (53-75). Berkeley: University of California Press, 2008.

Pearson, Jamie Parker, ed. *Digital at Work*. Bedford, MA: Digital Press, 1992.

Penny, Simon. "Systems aesthetics + cyborg art: The legacy of Jack Burnham." *Sculpture (Washington, D.C.)* 18, no. 1 (January 1999): 36-41. *Art Full Text (H.W. Wilson*), EBSCOhost (accessed March 17, 2013).

Picq, Anne. "Ryoji Ikeda & Benedict Gross: Art & mathématiques, à la frontière du connu." *Beaux Arts* Magazine 292 (2008), 92-5.

Pindar, Ian and Paul Sutton, trans. *The Three Ecologies*, by Félix Guattari. London: Continuum, 2000.

Polsinelli, Michael. "Ryoji Ikeda." *Flash Art* (International Edition) 41 (2008): 88.

PREMIS Working Group, OCLC. Premis Project. Accessed May 10, 2011. http://www.oclc.org/research/activities/past/orprojects/pmwg/premis-final.pdf.

_____ PREMIS Data Dictionary and XML Schemas. Library of Congress (LOC). Accessed May 10, 2011. http://www.loc.gov/standards/premis/.

Prom, Christopher J. (2009, December 21). Trustworthy digital objects [Web log posting]. Retrieved from: http://e-records.chrisprom.com/?p=620.

Quaranta, Domenico. *Media, new media, postmedia*. .Milano: Postmedia books, 2010.

_____. Collect the WWWorld: The Artist as Archivist in the Internet Age. Brescia: LINK Editions, 2011.

Randell, Brian, ed. *The Origins of Digital Computers: Selected Papers* 2nd ed. Berlin: Springer-Verlag, 1975.

Rayward, Boyd W. Visions of Xanadu: Paul Otlet (1868-1944) and Hypertext. *Journal of the American Society for Information Science*, *45*:2 (1994): 235-250.

Ricœur, Paul. *Temps et récit*, vol. III (Paris Éditions du Seuil, 1978); trans. Kathleen Blamey and David Pellauer, Time and Narrative, vol. III (Chicago: University of Chicago Press, 1988): 116-119.
Section on Archives, Documents and Traces is instructive for the etymology of the archive.

Rinehart, Richard. Preserving the Rhizome Artbase. New York: *Rhizome* @ the New Museum (2002). Accessed May 8, 2011. http://rhizome.org/artbase/report.htm.

_____. "A System of Formal Notation for Scoring Works of Digital and Veariable Media Art. " In *Media Art Histories Archive Refresh!* Presentations (2005). Accessed May 8, 2010. http://hdl.handle.net/10002/307.

_____, Director, Samek Art Gallery, Lewisburg, PA, interview by the author, New York, NY, 25 March 2013.

Runme.org. "Runme.org About Statement." Accessed March 30, 2013. http://runme.org/about.tt2.

Rush, Michael. *New Media in Art*. London: Thames and Hudson, 2005.

Santorineos, Manthos, and Toni Sant. "Rape, Murder and Suicide Are Easier When You Use a Keybouard Shortcut: Mouchette, and On-Line Virtual Character." *Leonardo* 38.3 (2005): 202-6, 221. *Art Full Text*. Accessed 20 Oct. 2010.

Scholz, Trebor. "The participatory challenge." In Joasia Krysa (Ed.), *DATA Browser 03. Curating immateriality: The work of the curator in the age of network systems*. New York: Autonomedia, 2006.

Shanken, Edward A. "The House that Jack Built: Jack Burnham's Concept of "Software" as a Metaphor for Art." *L.E.A. Archive* Issue 6:10 (November 17, 1998).

_____ , (ed.). *Art and Electronic Media*. New York: Phaidon, 2009.

Shannon, Claude E. "A Symbolic Analysis of Relay and Switching Circuits." *Transactions of the American Institution f Electrical Engineers* 57 (1938): 713-723.

Shaw-Miller, Simon. "Analysing musical multimedia (Book Review); Noise, water, meat (Book Review)." *Art History* 24: 1 (February 2001): 139-146. *Art Full Text* (*H.W. Wilson*), EBSCO*host* (accessed March 24, 2013).

Shirky, Clay. "Ontology is Overrated: Categories, Links, and Tags." *Clay Shirky's Writings About the Internet*, 2005. Accessed May 2011.
http://www.shirky.com/writings/ontology_overrated.html.

Stadler. Felix. *Open Cultures and Nature of Networks*. Novi Sad, Serbia: Futura Publikacije and Revolver, 2008a.

Sutton, Gloria. "Taxonomies, Definitions, Archives, etc." New-Media-Curating Discussion List, 7 September, 2004. Accessed December 2012.

Tauberer, Joshua. "Quick Intro to RDF." RDF about. Modified 2005. http://www.rdfabout.com/quickintro.xpd..

Thompson, Nato. *Experimental Geography: radical approaches to landscape, cartography and urbanism*. New York: Melville House, 2009.

Titlow, John Paul. "Yup, Jailbreaking Your iPad Really Is Illegal." ReadWrite Hack, October 28, 2012. Accessed November 10, 2012. http://readwrite.com/2012/10/28/yup-jailbreaking-your-ipad-is-illegal.

Tribe, Mark and Reena Jana, Uta Grosenick, eds. *New media art*. Köln: Taschen, 2003.

Vanegas, Gabriel. *Botaniq, Diaries of an interactor*. Conservation of experiences with Media Art. botaniq.org Accessed May 30, 2012. http://botaniq.org/2010/09/17/theory-of-botaniq/.

Wardrip-Fruin, Noah, & Nick Montfort, eds. *The new media reader.* Cambridge, Mass: The MIT Press, 2003.

Wiencek, Florian. "Informal Documentation." From Other Spaces, or-bits.com (May 18, 2012). Accessed on March 15, 2013. http://www.or-bits.com/blog/tag/informal-documentation-documenting-media-art/.

Wiener, Norbert. *Cybernetics, or Control and Communication in the Animal and the Machine*. Cambridge, Mass: MIT Press, 1948.

Wilson, Andrew. "Gustave Metzger's Auto-Destructive/Auto-Creative Art: An Art of Manifesto, 1959-1969." *Third Text* 22:2 (March 2008), 177-194. Accessed March 29, 2013. *Art Full Text*. doi: 10.1080/09528820802012844.

Witten, I. H. , Bainbridge, D. & Nichols, DM. "Interoperability: Protocols ad Services." In *How to Build a Digtial Library* (2nd ed.). Burlington, MA: Morgan Kaufmann, 2010.

Wolmuth,, Philip. "Magnum Photos Tagging Game." *British Journal of Photography Online*, Feb 17, 2011. http://www.bjp-online.com/british-journal-of-photography/report/2027044/magnum-photos-tagging-game

Zimmer, Robert. "Culture-Mining: Time-Based Cultural Documents and Online Meaning-Based research Tools." A Tate Research project (2007). Accessed March 10, 2012. http://www.ahrcict.rdg.ac.uk/activites/startegy_projects/zimmerupdate.pdf.

Zuse, Konrad. *The Computer—My Life*. New York: Springer-Verlag, 1993.

Figure 1 Marcel Duchamp, *Boîte en Valise*, 1948

Figure 2 Thomson and Craighead, *Trigger Happy*, screen capture from a web-based video game, 1998

Figure 3 Aby Warburg, *Mnemosyne Atlas*, 1925-1929

Figure 4 Aby Warburg, *Mnemosyne Atlas* Detail, 1925-1929

Figure 5 The Memex computer

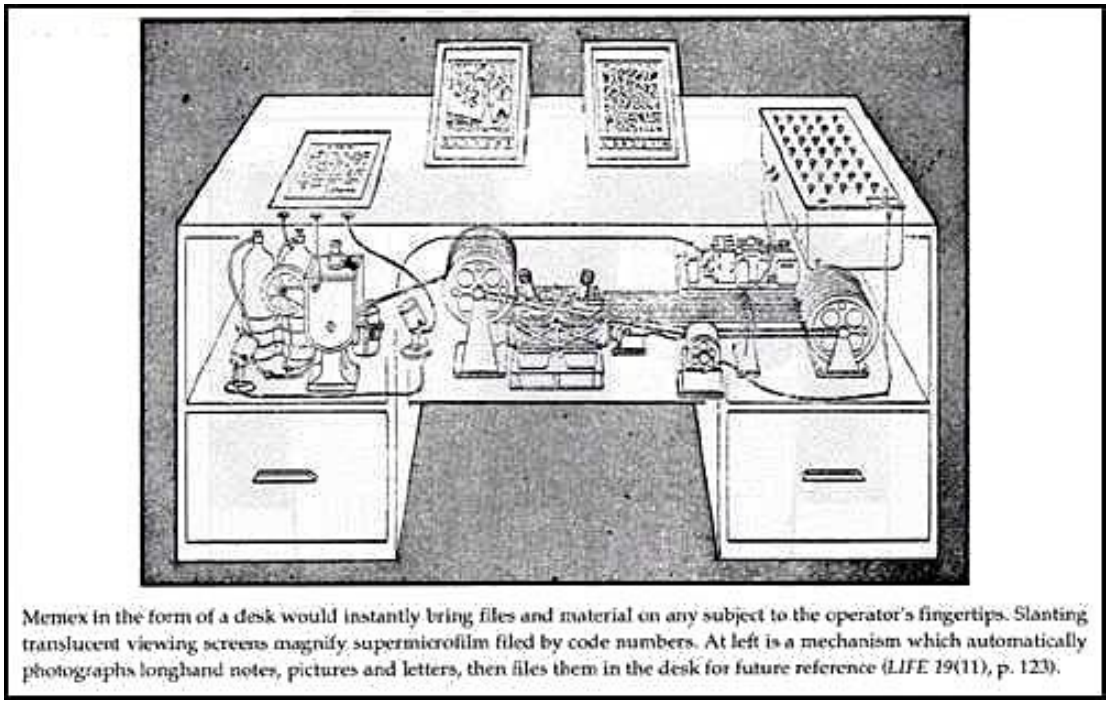

Memex in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference (*LIFE* 19(11), p. 123).

Figure 6 The Memex computer, interior

Figure 7

Figures 7—9 Female telephone switchboard operators (the first "supercomputers")

Figure 8

Figure 9

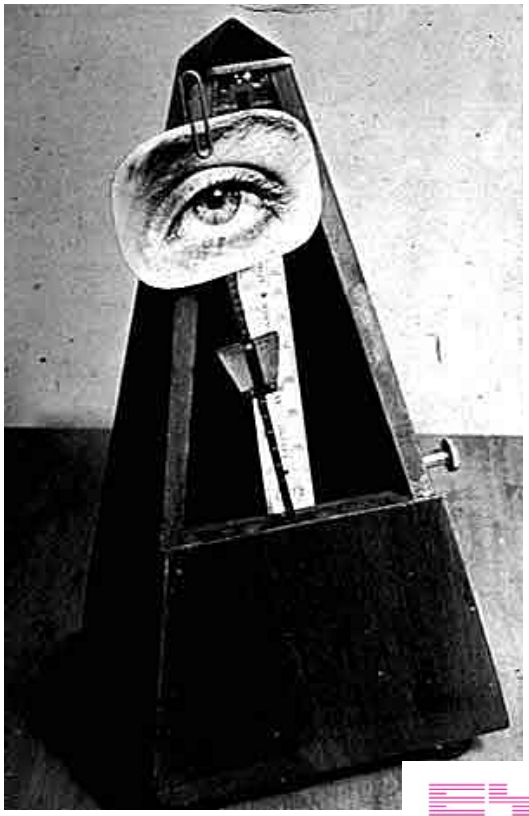


Figure 10 Man Ray, *Object to Be Destroyed* (aka *Indestructible Object*), 1923

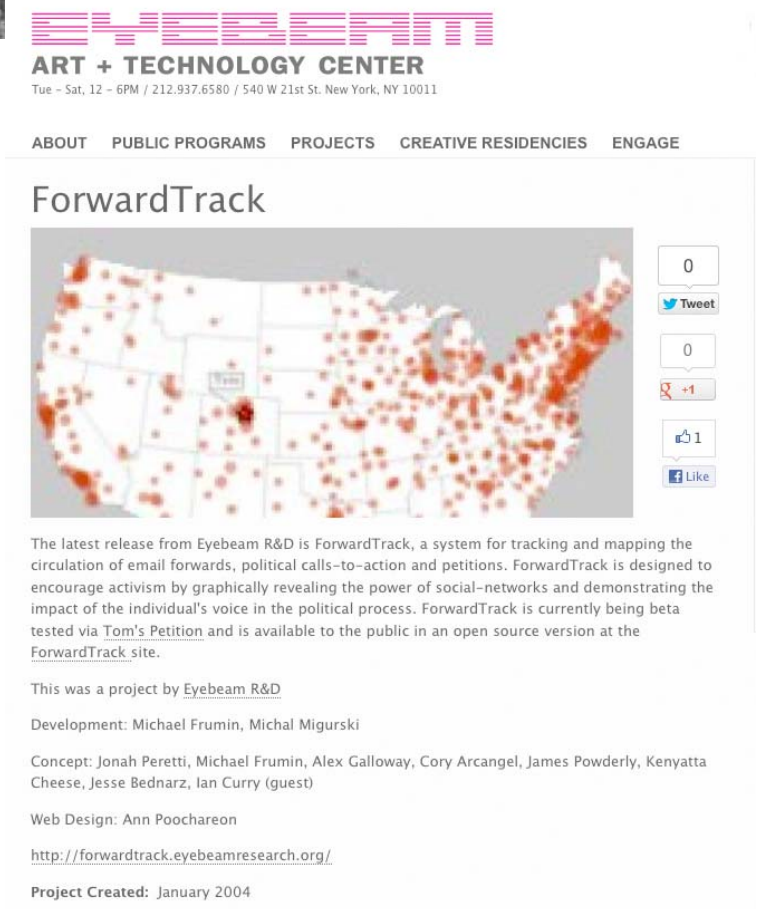


Figure 11 Eyebeam Art & Technology Center, *flyer*, 2004

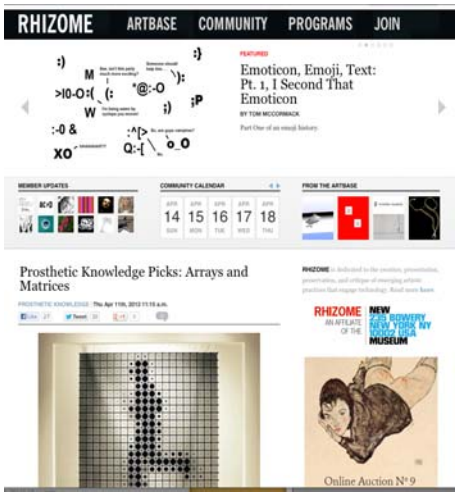


Figure 12 http://rhizome.org

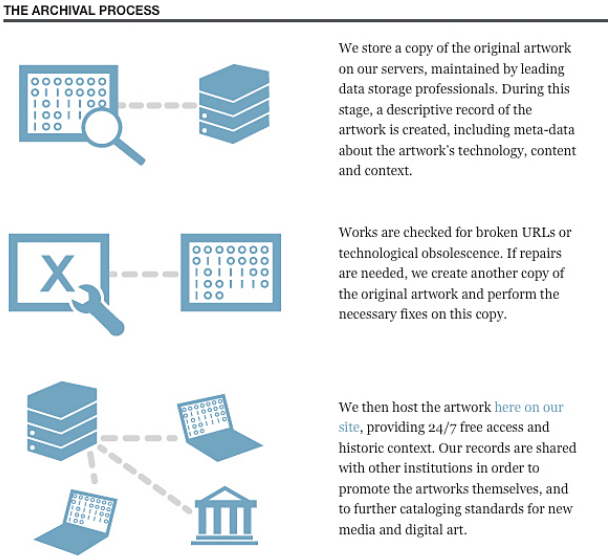


Figure 13 Rhizome's cataloging practice, http://rhizome.org/artbase/about/

Figure 14 Digital Public Library of America, 2013 http://exp.lore.com/post/47739765302/the-digital-public-library-of-america-represents

Figure 15 0-Day art project for conserving digital art, Jeremiah Johnson, 2012

Figure 16 http://mouchette.org

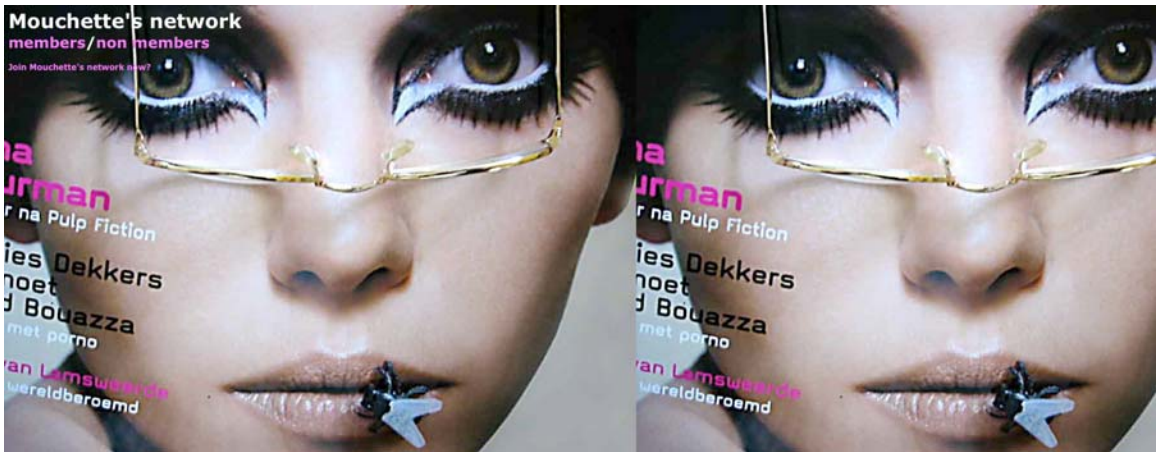


Figure 17 http://mouchette.org

Figure 18 http://mouchette.org

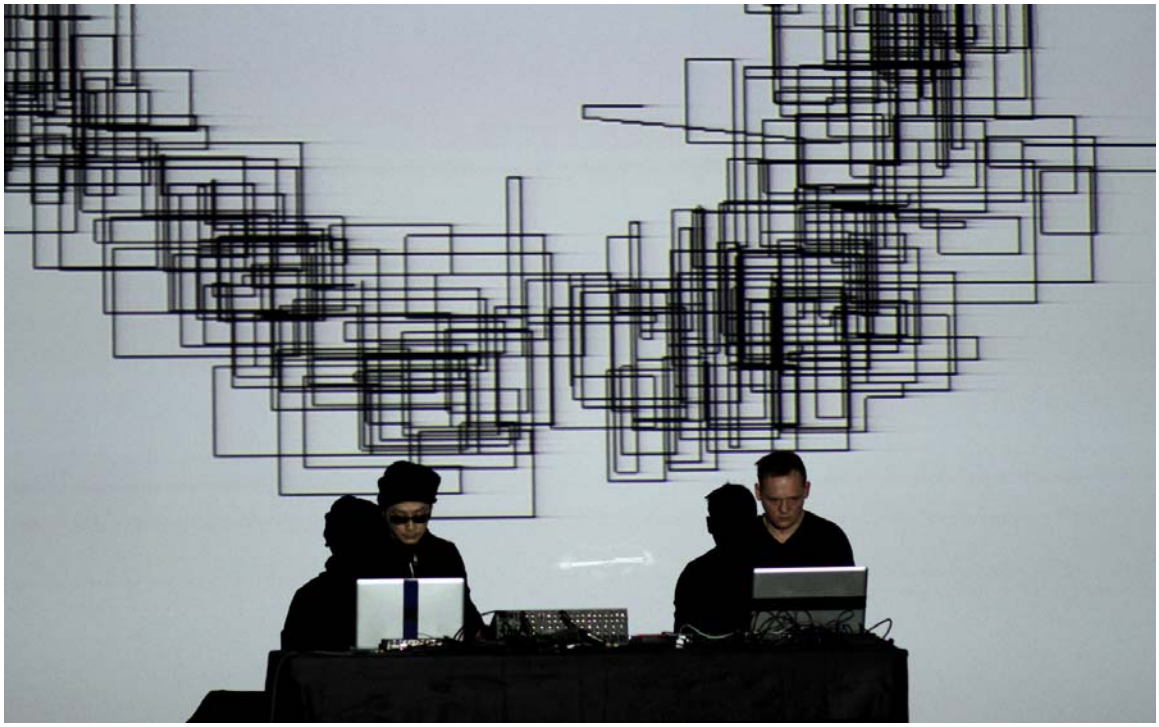


Figure 19 Ryoji Ikeda, Terminal 5 Exhibition performance, 2004
http://www.epavlispavlakis.com/ryoji-ikeda/

Figure 20 Ryoji Ikeda, *Test Pattern*, 2010
http://michaelbierylo.berkleemusicblogs.com/2010/03/26/ryoji-ikeda/

Figure 21 Ryoji Ikeda, *Datamatics 2.0*
http://www.artsblog.it/post/3927/ryoji-ikeda-datamatics-20-a-mito

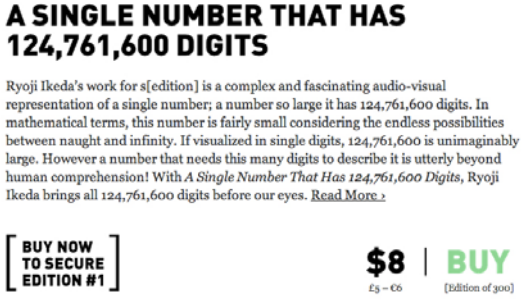


Figure 22 Ryoji Ikeda's work on s[edition]

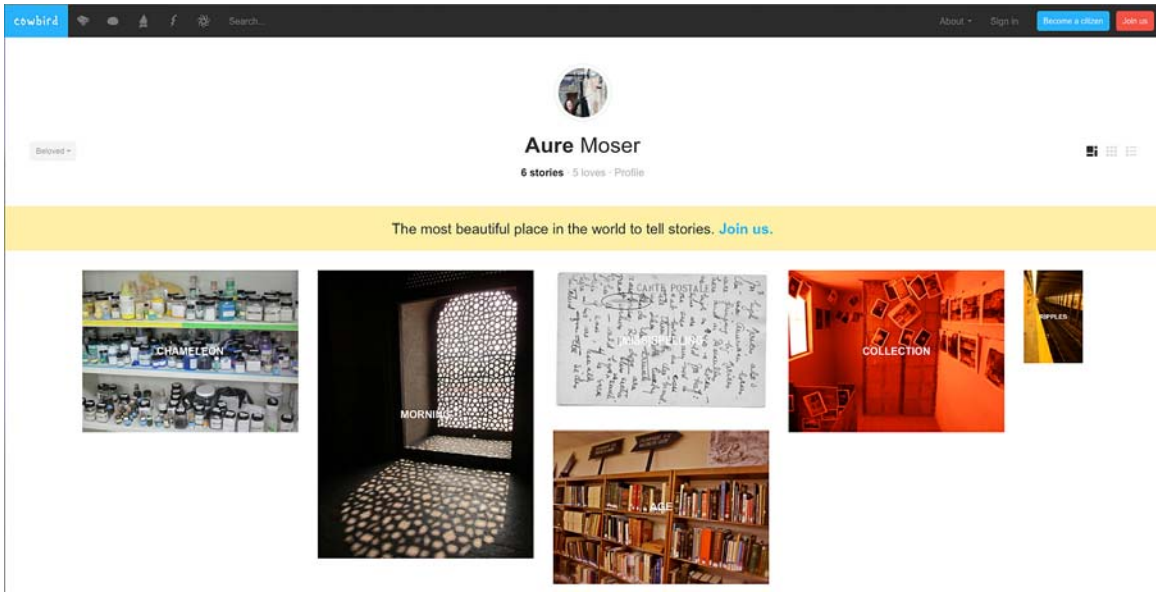


Figure 23 Jonathon Harris, *Cowbird.org,* 2012 http://cowbird.com/aure-moser/

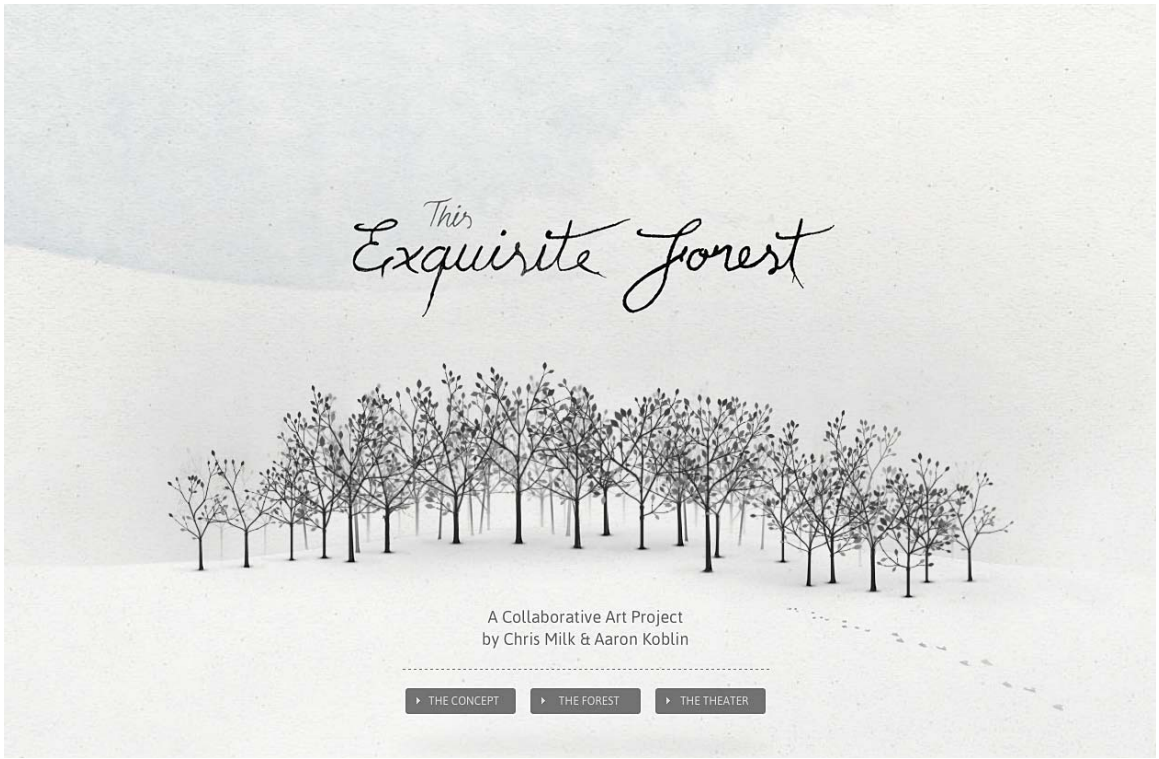


Figure 24 Aaron Koblin, *This Exquisite Forest*, 2013 http://www.exquisiteforest.com/

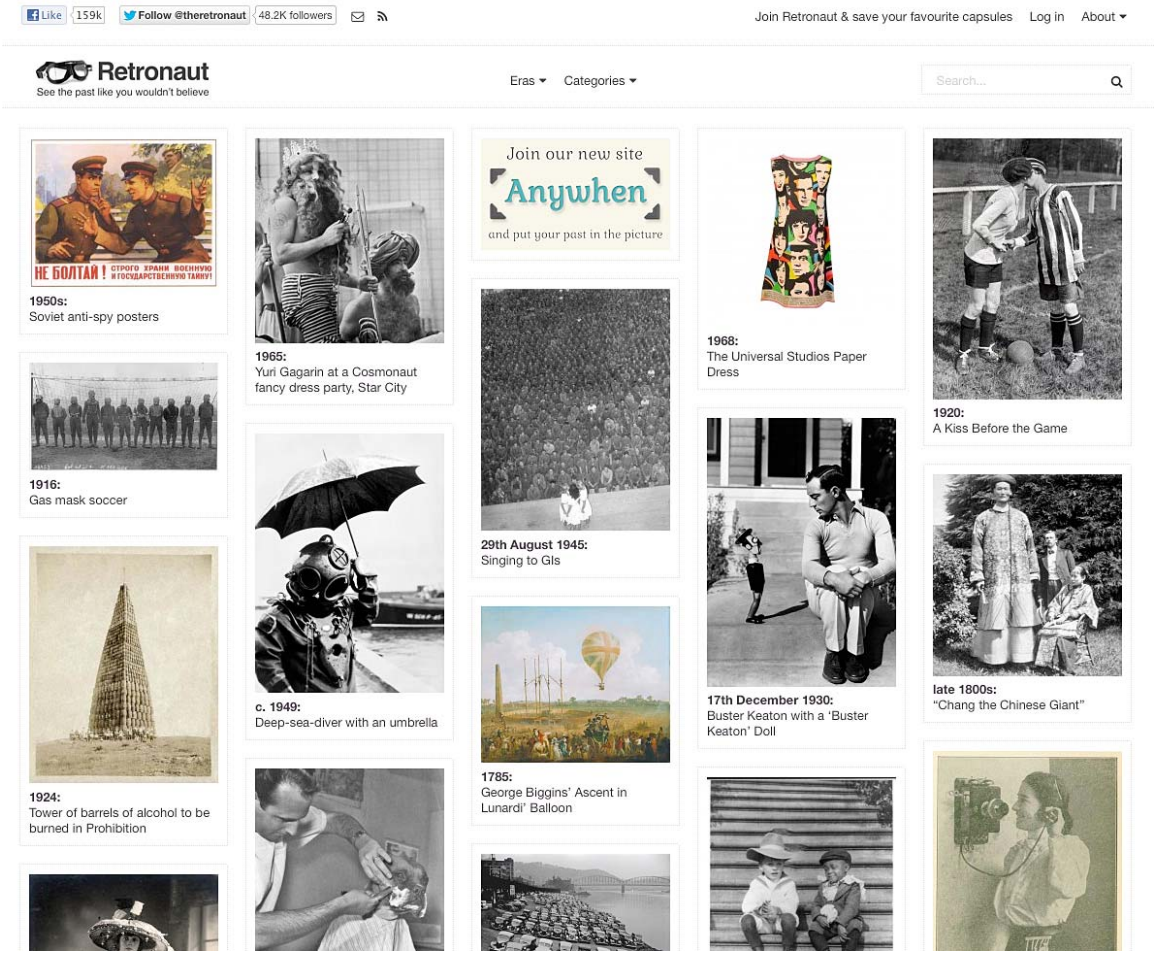


Figure 25 Retronaut.org, 2013 http://www.retronaut.com/

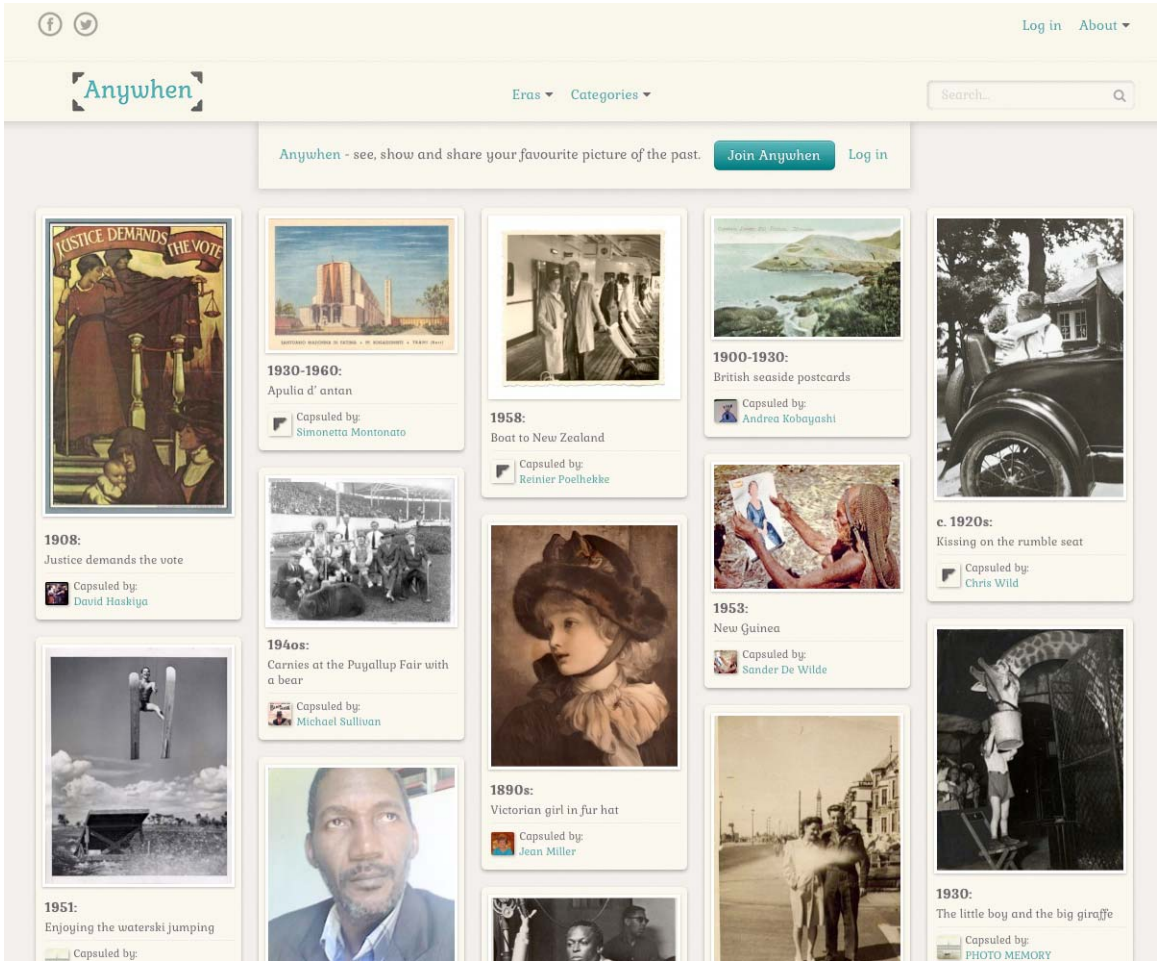


Figure 26 Anywhen.com, 2013 http://www.anywhen.com/