Activating Materialities: Identifying Strategies of Acceptable Loss When Remediating Museum Objects Online

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Museums have specialized in the onsite exhibition of non-digital collection objects for hundreds of years but have yet to achieve similar levels of expertise, engagement, and interest in online venues across the industry. Although they were early adopters of digital communication technologies, museums have since become complacent about producing exceptional online content or hesitant to implement innovative approaches to online public engagement. Museums were forced to confront this lack of stimulating, online public offerings when the COVID-19 pandemic closed the doors of cultural heritage institutions around the world in 2020. Within months, online programming and exhibitions needed to be adapted, created, and advertised with great urgency to accommodate the institutions' engagement missions through web-based technologies.

In this dissertation, I investigate how three types of museums, all part of the Carnegie Museums of Pittsburgh, digitally enacted onsite object programming and exhibition through online means during the 2020 museum closures. Specifically, this study examines how and why the social and material capacities of objects, practices, and mediation strategies are differently activated by these institutions when objects were remediated through an online platform. To understand the consequences of moving these object interactions online, I first consider the historical, institutional, and object-centered conditions that produced the original onsite enactments before moving to a study of which aspects of these site-based object engagements were transferred online, and which were left behind. I argue that cultural heritage workers need to actively acknowledge

what sociomaterial affordances they are giving up in favor of others–a determination I refer to as the threshold for acceptable loss–when adopting online object-based mediation strategies to set realistic expectations of the audience experience and to understand the educational and experiential impact of using certain representational systems when digitally mediating museum objects.

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1.0 The Research Problem

In this dissertation, I investigate how objects are constructed and performed across onsite and online museum contexts. I look at how objects and mediation strategies enact–that is, bring the objects about in a performance or display–different sociomaterial affordances in public exhibition or programming and how those strategies and settings, in turn, shape the expression of those objects. Specifically, the purpose of this study is to examine the shifting affordances between onsite and online object enactments through the relationships of objects, practices, and mediation strategies in museums. This study is designed to consider the historical, institutional, and object conditions that encouraged the long-standing onsite versions under examination, which aspects of these object enactments were transferred, and which were left behind to understand the practical and conceptual consequences of enacting those same objects online.

For hundreds of years, museums have specialized in the meaningful onsite exhibition of non-digital objects, but have failed to achieve similar levels of expertise, engagement, and interest in the digital space across the industry. Some of the first institutions to hop on the burgeoning World Wide Web train, museums "went digital" in 1995 but the decades since have seen mixed adoption and acclaim of information and communications technologies (ICTs) across collecting institutions.[1] On one hand, online technologies have been recognized as cost-effective and efficient means of experimentation, collaboration, and accessibility for research and exhibition purposes.[2]

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[1] Suzanne Keene, "Becoming Digital," *Museum Management and Curatorship* 15, no. 3 (1997): 299; Mafkereseb Kassahun Bekele et al., "A Survey of Augmented, Virtual, and Mixed Reality for Cultural Heritage," *Journal on Computing and Cultural Heritage* 11, no. 2 (2018), https://doi.org/10.1145/3145534.

[2] Aleksandr Gelfand, "If We Build It (and Promote It) They Will Come: History of Analog and Digital Exhibits in Archival Repositories," *Journal of Archival Organization* 11, no. 1-2 (2013): 5-27, https://doi.org/10.1080/15332748.2013.882160; Wendy A. Thomas and Sheila Carey, "Actual/Virtual Visits: What

Studies have also suggested that online presence increases foot traffic to museum buildings through a cyclical and complementary relationship that encourages the pursuit of onsite experiences and face-to-face experiences.[3] Facilitating the creation of online communities of like-minded museum enthusiasts unconstrained by geographical location has been noted as another benefit of using online technologies.[4]

On the other hand, the literature also shows that museums have been hesitant to adopt digital approaches because, in some cases, they fear a lack of authority and control over their collection, while in others they have come to recognize that even the best efforts tend to fall short in terms of audience engagement or sustainability.[5] Online experiences, especially those that require interaction or social engagement, are "often thought to be imaginary or insignificant when

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are the Links," in *Museums and the Web 2005: Proceedings*, ed. Jennifer Trant and David Bearman (Toronto: Archives and Museum Informatics, 2005), https://www.archimuse.com/mw2005/papers/thomas/thomas.html; Lara Putnam, "The Transnational and the Text-Searchable: Digitized Sources and the Shadows They Cast," *American Historical Review* 121, no. 2 (2016): 377-402, https://doi.org/10.1093/ahr/121.2.377; Claire Warwick et al., "Library and Information Resources and Users of Digital Resources in the Humanities," *Program* 42, no. 1 (2008): 5-27, https://doi.org/10.1108/00330330810851555.

[3] John H. Falk et al., "The Contribution of Science-Rich Resources to Public Science Interest," *Journal of Research in Science Teaching* 55, no. 3 (2018): 422-45, https://doi.org/10.1002/TEA.21425; Katerina Kabassi, "Evaluating Websites of Museums: State of the Art." *Journal of Cultural Heritage* 24 (2017): 184-96, https://doi.org/10.1016/J.CULHER.2016.10.016; Paul F. Marty "Museum Websites and Museum Visitors: Before and after the Museum Visit." *Museum Management and Curatorship* 22, no. 4 (2007): 337-60, https://doi.org/10.1080/09647770701757708; Mario Siglioccolo, Mirko Perano, Alfonso Siano, Marco Pellicano, and Ian Baxter. "Exploring Services Provided by Top Italian Museums Websites: What Are They Used For?" *International Journal of Electronic Marketing and Retailing* 7, no. 2 (2016): 141-58, https://doi.org/10.1504/IJEMR.2016.077119.

[4] Eugene Ch'ng et al., "Adoption and Use of Emerging Cultural Technologies in China's Museums," *Journal of Cultural Heritage* 37 (2019): 170-80. https://doi.org/10.1016/J.CULHER.2018.11.016; Tien Li Chen, Wei Chun Lai, and Tai Kuei Yu, "Participating in Online Museum Communities: An Empirical Study of Taiwan's Undergraduate Students," *Frontiers in Psychology* 11 (2021), https://doi.org/10.3389/FPSYG.2020.565075/BIBTEX.

[5] Fiona Cameron, "Beyond the Cult of the Replicant: Museums and Historical Digital Objects—Traditional Concerns, New Discourses," in *Theorizing Digital Cultural Heritage: A Critical Discourse*, ed. Fiona Cameron and Sarah Kenderdine (Cambridge: MIT Press, 2007), 55; Aisling Quigley, "Striving to Persist: Museum Digital Exhibition and Digital Catalogue Production," PhD diss., University of Pittsburgh, 2019; Antonia Silvaggi and Federica Pesce, "Job Profiles for Museums in the Digital Era: Research Conducted in Portugal, Italy and Greece within the Mu.Sa Project," *ENCATC Journal of Cultural Management and Policy* 8, no. 1 (2018): 56-69, https://www.encatc.org/media/4535-encatc_journal_vol8_issue1_silvaggi_pesce.pdf; John Stack, "Exploring Museum Collections Online: Some Background Reading," *Science Museum Group Digital Lab*, January 23, 2018, https://lab.sciencemuseum.org.uk/exploring-museum-collections-online-some-background-reading-da5a332fa2f8.

compared to face-to-face communications," an artificiality implied by both cultural heritage practitioners and audiences due to a supposed diminished affordance of "being there."[6] Perhaps an unreasonable expectation for technology to "encode the totality of our world," this "lack" of presence remains an ongoing concern for museum visitors and exhibition designers.[7] While many museums have continued to explore web-based possibilities of object enactment, from the use of robust multimedia exhibits with high-quality digital surrogates, such as the *Every Eye Is Upon Me: First Ladies of the United States* online exhibit from the Smithsonian National Portrait Gallery, to simulated spatial experiences like V21 Artspace's portfolio of "3D Virtual Museum and Cultural Spaces," others have become complacent with a logistics and advertising-focused internet presence by using their websites as tools for bringing people onsite instead of as space in its own right for engaging audiences with museum objects.[8]

The object enactments selected for this study come from a unique, though unenviable, opportunity in our history that circumvented these arguments by making them practically obsolete for a significant period of time. In 2020, the novel coronavirus (Covid-19), "a highly pathogenic viral infection caused by SARS-CoV-2," inundated communities around the globe and, for the first

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[6] Grant Bollmer, *Materialist Media Theory: An Introduction* (New York: Bloomsbury Publishing, 2019), 10; Ulrike Schultze and Jo Ann M. Brooks. "An Interactional View of Social Presence: Making the Virtual Other 'Real'." *Information Systems Journal* 29, no. 3 (2019): 709. https://doi.org/10.1111/ISJ.12230; Brian E. Mennecke et al., "An Examination of a Theory of Embodied Social Presence in Virtual Worlds," *Decision Sciences* 42, no. 2 (2011): 413-50, https://doi.org/10.1111/J.1540-5915.2011.00317.X.

[7] Bollmer, *Materialist Media Theory*, 13; Emma Thorne-Christy, "In Defense of the Physical Exhibition a Plea to Not 'Move' Exhibitions Online," *Museum Next*, May 19, 2020. https://www.museumnext.com/article/in-defense-of-the-physical-exhibition-a-plea-to-not-move-exhibitions-online; Stella Doukianou, Damon Daylamani-Zad, and Ioannis Paraskevopoulos, "Beyond Virtual Museums: Adopting Serious Games and Extended Reality (XR) for User-Centred Cultural Experiences," *Springer Series on Cultural Computing* (2020), https://doi.org/10.1007/978-3-030-37191-3_15; Craig MacDonald, "Assessing the User Experience (Ux) of Online Museum Collections: Perspectives from Design and Museum Professionals," in *MW2015: Museums and the Web 2015* (Silver Spring, MD: Museums and the Web, 2015), https://mw2015.museumsandtheweb.com/paper/assessing-the-user-experience-ux-of-online-museum-collections-perspectives-from-design-and-museum-professionals.

[8] "First Ladies of the United States Exhibition," National Portrait Gallery, accessed April 9, 2022, https://firstladies.si.edu; "Virtual Museum & Cultural Spaces," V21 Artspace, accessed June 30, 2022, https://v21artspace.com/virtual-museum-cultural-space-tours.

time in history, museums worldwide "experienced a 'fast-forwarding' of technological reliance and adaptation."[9] The virus was declared a national public health emergency in the United States on January 31st, a pandemic by the World Health Organization on March 11th, and a US national emergency on the 12th.[10] Spread by small droplets during close contact with other people and contaminated surfaces, the infectious disease forced the closure of gathering spaces, including schools, performance and sports venues, dine-in facilities, and most places of work other than those considered life-sustaining. New York museums were the first batch of US museums to close their doors to on-site operations on March 13th with others soon following suit as social distancing measures and shelter in place orders were issued.

During this time, many museums increased their "digital activities" including the cases considered in this dissertation from the Carnegie Museums of Pittsburgh.[11] The Carnegie Museums of Pittsburgh collectively joined the "Museums From Home" movement in creating or promoting online learning and engagement opportunities amidst closures and social distancing measures that in several cases were not discussed before the pandemic. Compelled by the constraints of the virus, the institutions in this study were forced to rely on online strategies for their public-facing goals. This inability to physically access onsite offerings created the opportunity to study remediations

[9] Saima Hamid, Mohammad Yaseen Mir, and Gulab Khan Rohela, "Novel Coronavirus Disease (Covid-19): A Pandemic (Epidemiology, Pathogenesis and Potential Therapeutics)," *New Microbes and New Infections* 35, no. 100679 (2020), https://doi.org/10.1016/j.nmni.2020.100679; Arthur Cohen, "A Time of Transformation," *Museum* Magazine, March 1, 2022, https://www.aam-us.org/2022/03/01/a-time-of-transformation.

[10] Domenico Cucinotta and Maurizio Vanelli, "WHO Declares COVID-19 a Pandemic," *Acta Biomed* 19;91, no. 1:157-160, doi: 10.23750/abm.v91i1.9397; U.S. Proclamation no. 9994, 85 FR 15337 (March 13, 2020).

[11] International Council of Museums, *Museums, Museum Professionals and COVID-19* (2020). https://icom.museum/wp-content/uploads/2020/05/Report-Museums-and-COVID-19.pdf. According to a survey conducted by the International Council of Museums in April and May of 2020, 94.7% of museums across the globe were closed due to Covid-19. All "digital activities" (including online collections, online exhibitions, live events, newsletters, podcasts, quizzes/contests, and social media) increased or began after the lockdowns for at least 15% of participants.

of object enactments in an unusual sort of vacuum wherein staff had to act relatively quickly, revealing their core considerations during remediation.

In this dissertation, I investigate how three types of museums remediated onsite object enactments through online means during the 2020 museum closures. Through the case findings, I then suggest a strategy for conceptualizing online object enactments in all cases but especially in cases of web-based remediated museum objects through layers of industrial conditions, presentational contexts, and originary technicity to develop a sociomaterially informed online remediation process. My conception of sociomateriality, and that which guides this study, is focused on how practices in the social world are both relational and "about the physical stuff caught up and shaped in those relations."[12] When enacting objects, I argue that cultural heritage workers need to acknowledge what sociomaterial affordances they are giving up in favor of others when adopting mediation strategies to have realistic expectations of what is possible and to understand the consequences of using certain representational systems in the performance of museum objects. Acknowledging that "digital representation is in several ways not a copy of the original object, and neither does it pretend to be," I acknowledge that online object enactment is not a copy of the original enactment nor am I arguing that it should be.[13] What I am suggesting, however, is that there appear to be significant properties in the relationships between objects, practices, and mediation techniques that require a more sophisticated and nuanced understanding when making decisions about how to bring objects online.

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[12] John Law, "Material Semiotics," unpublished manuscript, last modified January 30, 2019, Portable Document Format file, http://www.heterogeneities.net/publications/Law2019MaterialSemiotics.pdf.

[13]Ole Marius Hylland, "Even Better than the Real Thing? Digital Copies and Digital Museums in a Digital Cultural Policy," *Culture Unbound* 9, no. 1 (2017): 64. https://doi.org/10.3384/cu.2000.1525.179162.

1.1 Significance of the Study

In this study, I respond to calls from researchers in science, technology, and society studies (STS), also referred to as science and technology studies, to take a closer look at the practical and specific ways that operators and materials shape one another to contribute to the question of "what kinds of relations, ontologies, and agencies are assumed to be desirable or deemed to be expendable in these technological worlds."[14] By conducting biographies of museum objects and practices, I examine the pragmatic and conceptual processes behind, and implications of, the public enactment of museum objects. Given the multi-sited, multi-temporal, and generative nature of the research process in this study, the significance functions across several levels of scope. The specificity and depth with which I conduct the case-level research contributes to the literature that seeks to understand how objects, practices, and technologies *do things*, particularly how they do things together through their sociomateriality across different platforms.

In approaching challenges of digital representation in cultural heritage institutions through a sociomaterial lens, this research reflects upon and is intended to impact practices of remediation in museums specifically, but the proposed framing has a practical significance for all heritage institutions in the GLAM industry (galleries, libraries, archives, and museums) that create online public programming using collection objects. These institutions have an interest in providing educational, informational, and/or entertaining content for their public audience. Though

[14] Alexandre Camus and Dominique Vinck, "Unfolding Digital Materiality: How Engineers Struggle to Shape Tangible and Fluid Objects," in *digitalSTS: A Field Guide for Science and Technology Studies*, ed. Janet Vertesi and David Ribes (Princeton: Princeton University Press, 2019): 18; David Ribes, "Materiality Methodology, and Some Tricks of the Trade in the Study of Data and Specimens," in *DigitalSTS: A Field Guide for Science and Technology Studies*, ed. Janet Vertesi and David Ribes (Princeton: Princeton University Press, 2019), 43; Kerasidou, Xaroula Charalampia, "Feminist STS and Ubiquitous Computing: Investigating the 'Nature' of Ubicomp," in *digitalSTS: A Field Guide for Science and Technology Studies*, ed. Janet Vertesi and David Ribes (Princeton: Princeton University Press, 2019), 101.

stagnancy exists in some technological arenas due to reasons that will be explored in the literature review, enacting objects online will inevitably continue to be practiced in these institutions so long as ICTs exist and visitors who look to online resources expect a seamless experience between their onsite and online museum visits.[15] This dissertation is intended to contribute to this work by first exploring methods of evaluating the mediating relationships involved in enacting a museum object onsite to identify affordances that might be considered essential to the story of the object and the institution. Then, by exploring how these affordances are or are not, or can and cannot be, transferred into digital remediations, these institutions will be better equipped to decide the parameters of their digital remediations, which impacts decisions behind object selection, hardware and software considerations, and the development of professional roles to support these parameters.

Agreeing with Hannah McGregor that digital remediation "is not simply a means of preservation or dissemination, but a creative and critical intervention," this study also encourages creative and critical interventions in enacted remediations from a sociomaterial perspective.[16] By understanding what aspects of an object enactment are important or consequential to that enactment, practitioners then have the tools to know what is important about the stories they intend to tell about non-digital objects in an online setting, and then they can proceed to productively and intentionally manipulate, enhance, or break the aspects that can or should be changed.

Additionally, I propose strategies for implementing aspects of object biographical surveys in cultural heritage institutions to inform practices of digital remediation of non-digital objects

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[15] Gelfand, "If We Build It," 74; Yue Wu et al., "Critical Factors for Predicting Users' Acceptance of Digital Museums for Experience-Influenced Environments," *Information* 12, no. 10 (2021), https://doi.org/10.3390/info12100426.

[16] McGregor, "Remediation as Reading: Digitising the Western Home Monthly," *Archives and Manuscripts* 42, no. 3 (2014): 256, https://doi.org/10.1080/01576895.2014.958864.

through three dimensions. Synthesized in the comparative case analysis of the biographical case studies, I conclude that the sociomaterial relationships operate across varying scales which I categorize as the industrial conditions, the presentational context, and "originary technicity," each of which shapes the enactment affordances. Industrial conditions refer to the historical and current trends in the institution's industry and technological capacities, presentational context refers to the particular public-facing situations objects are inserted into through industrial practices at a given time, and originary technicity refers to what the objects themselves bring to the enactment. By providing a skeleton for teasing these aspects of an object enactment apart and tracing their affordances, I offer a structure for determining the threshold of acceptable loss of some affordances and the ability to develop opportunities for other affordances especially in digitally remediated settings.

1.2 Research Questions

This dissertation addresses two research questions:

Question 1:

Part 1: How were objects digitally enacted during the Covid-19 closures? What, if any accommodations were made due to the closures?

Part 2: What were the criteria for successful online remediations of museum objects?

Question 2:

How have museums intersected or diverged in their practices of creating online remediated object enactments?

1.3 Themes of Study

In alignment with methods and phenomena of interest to STS scholars and the positioning of this research in discussion with cultural heritage practices through the BOAP approach, I designed this study around three main themes: sociomateriality, digital remediation, and the use of ICTs in museums. This approach allowed me to examine types of object enactments within the selected sites before and after digital remediation to determine where shifts in affordance occurred between mediation strategies at the case level and between types of object and institutions at the cross-case level.

1.3.1 Sociomateriality

In this dissertation, I investigate the enactments by looking at the "specific ways in which the features of particular artifacts become entangled in the social practices of people's work."[17] As such, sociomateriality, or the relational enactments of the social and the material in the world's becoming, is the theoretical and thematic foundation that ultimately drives this study. Used in social science fields such as organizational studies and STS as a methodological framework for conducting empirical research, sociomateriality is focused on how practices in the social world shape the materiality of technologies and, in turn, how the materialities of the technology afford possibilities in their entanglement with the social.[18] The sociomaterial perspective, as espoused by

[17] Paul M. Leonardi and Stephen R. Barley, ""Materiality and Change: Challenges to Building Better Theory About Technology and Organizing," *Information and Organization* 18 (2008): 164, https://doi.org/10.1016/j.infoandorg.2008.03.001.

[18] Paul M. Leonardi, "Materiality, Sociomateriality, and Socio-Technical Systems: What Do These Terms Mean? How Are They Related? Do We Need Them?" in *Materiality and Organizing: Social Interaction in a*

scholars like Karen Barad, Wanda Orlikowski, Susan Scott, John Law, and Lotta Hultin among others, encourages research that assumes that "there is no social that is not also material, and no material that is not also social."[19]

The sociomaterial lens places an emphasis on the concept of materiality and a focus on affordances. In this dissertation, materialities are understood as properties of objects that have the potential to shape, restrict, and promote actionable possibilities and limitations. This concept is similar to, and my understanding is influenced by, computer scientist Paul Dourish's definition of materiality as "the nature of the substrates and the properties that constrain and condition the designerly encounter."[20] From the user perspective, these are properties of agents that "predate the actions to which it will be put and the perceptions it will help create."[21] These properties become more or less activated depending on the situation at hand and that is where the concept of affordances becomes useful. A term originally coined by the founder of ecological psychology James Gibson in his examination of visual perception, "affordances" refers to all action possibilities with an object based on the environment and users' physical capabilities.[22] In this

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Technological World, ed, Paul M. Leonardi, Bonnie A. Nardi and Jannis Kallinikos (Oxford: Oxford University Press, 2012), 33.

[19] Barad, *Meeting the Universe Halfway* (Durham: Duke University Press, 2007); Orlikowski, "Sociomaterial Practices: Exploring Technology at Work," *http://dx.doi.org/10.1177/0170840607081138* 28, no. 9 (2007): 1437, https://doi.org/10.1177/0170840607081138; Orlikowski and Scott, *The Entangling of Technology and Work in Organizations*, LSE Working Paper Series, no. 168 (London: London School of Economics and Political Science, 2008), http://eprints.lse.ac.uk/33898; Law, *After Method: Mess in Social Science Research* (New York: Routledge, 2004); Hultin, "On Becoming a Sociomaterial Researcher: Exploring Epistemological Practices Grounded in a Relational, Performative Ontology," *Information and Organization* 29, no. 2 (2019): 91-104, https://doi.org/10.1016/j.infoandorg.2019.04.004.

[20] Dourish, *The Stuff of Bits: An Essay on the Materialities of Information* (Cambridge, MA: MIT Press, 2017), 6.

[21] Paul M. Leonardi, "Theoretical Foundations for the Study of Sociomateriality," *Information and Organization* 23 (2013): 69, https://doi.org/10.1016/j.infoandorg.2013.02.002.

[22] Isis Chong and Robert W. Proctor, "On the Evolution of a Radical Concept: Affordances According to Gibson and Their Subsequent Use and Development," *Perspectives on Psychological Science* 15, no. 1 (2020), https://doi.org/10.1177/1745691619868207. Officially coined in his 1969 book *The Senses Considered as Perceptual Systems*, then *The Ecological Approach to Visual Perception*, 1979.

study, the term affordances bears a heavy burden because it is one word that addresses the entirety of the contextually situated nature of an enactment. An affordance is that which constrains or enables action and experience at the intersection of the social, the material, and the environment.

1.3.2 Museums and Digital Communications Technologies

Through a sociomaterial lens, this study of affordances is situated in museums and revolves around the relationships between museum objects and museum practices involving ICTs for public engagement. Museums are institutions based on the notion of authority and that authority relies on conceptions of ownership, authenticity, and trustworthiness–all of which have been challenged in the digital age due to issues of ownership rights, increased interpretive approaches to knowledge, abundant access to digital representations, and calls for transparency, among other issues.[23] Though authority was contested terrain in museums before the digital age, these institutions have maintained some semblance of an authorial voice by holding onto one-of-a-kind, mostly non-digital, objects. [24] Although these objects change when they become museum objects through a process called musealization, these musealized objects are collected, preserved, studied, and exhibited as documentation or proof that supports their authority along with the concepts, cultures, etc. intended to be encapsulated in the ongoing existence of these objects.[25]

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[23] Victoria Cain, "Exhibitionary Complexity: Reconsidering Museums' Cultural Authority," *American Quarterly* 60, no. 4 (2008), 1143-51, https://doi.org/10.2307/40068568; Andrea Witcomb, "The End of the Mausoleum: Museums in the Age of Electronic Communication," in *Museums and the Web: An International* Conference (1997), https://www.archimuse.com/mw97/speak/witcomb.htm; Ivan Karp, ed., *Museum Frictions* (Durham: Duke University Press, 2006).

[24] Michelle Horwood, *Sharing Authority in the Museum: Distributed Objects, Reassembled Relationships* (New York: Taylor and Francis Group, 2019).

[25] Kiersten Latham, "Jungles, Rabbit Holes, and Wonderlands: Comparing Conceptions of Museality and Document," *Proceedings from the Document Academy* 3, no. 1 (2016). https://doi.org/10.35492/docam/3/1/9*;* André Desvallées and François Mairesse, ed., *Key Concepts of Museology*, trans. Suzanne Nash (International Committee for Museology, 2010), https://icofom.mini.icom.museum/publications/key-concepts-of-museology.

With digital technologies, contemporary cultural heritage institutions like museums have had to reconsider their authority via *musealia*, or museum objects that have a specific relationship with reality through a change of context and accumulation/presentation, especially as they are mediated through the networked environment of the World Wide Web.[26] The creation of web-based, computer-mediated audience engagement enables versatility in terms of learning style personalization, accessibility, and information dissemination, but it also pushes the boundaries of contextualization and shifts aspects of museum objects that may be phenomenologically, if not ontologically, consequential to the object enactments and the objects themselves.

1.3.3 Digital Remediation

In this study, I examine the affordances of object enactments and how those affordances transferred or were activated from one version of enactment to another and how the remediated enactment established new affordances. In any type of remediation, there are consequences to this transfer in terms of affordances, and this study results in the discussion of the consequences of affordance transfer during digitally remediated enactments of museum objects. In cultural heritage institutions that pride themselves on collecting unique and original artifacts and specimens, these consequences expose challenges to authenticity, authority, and the persistence of object and enactment identity when moved into a particular type of online mediation.[27] As the founding

[26] Latham, "Jungles, Rabbit Holes, and Wonderlands."

[27] Maryanne Dever and Linda Morra, "Literary Archives, Materiality and the Digital," *Archives and Manuscripts* 42, no. 3 (2014): 223-26, https://doi.org/10.1080/01576895.2014.966731; Hylland, "Even better than the real thing?"; Trevor Owens and Thomas Padilla, "Digital Sources and Digital Archives: Historical Evidence in the Digital Age," *International Journal of Digital Humanities* 1 (May 2020), https://doi.org/10.1007/s42803-020-00028-7; Ala Rekrut, "Matters of Substance: Materiality and Meaning in Historical Records and Their Digital Images," *Archives and Manuscripts* 42, no. 3 (2014): 238-247, https://doi.org/10.1080/01576895.2014.958865; Matt

partner of Archives & Museum Informatics David Bearman wrote in 1995, "Nothing about the proposition that museums should extend their potential audience by digitally 're-presenting' their holdings and the knowledge they possess about them is simple, not technologically, culturally, or intellectually."[28]

Through the theoretical lens of the materiality and affordances of sociomateriality and in the context of museums and their relationship with digital technologies, the phenomena under investigation is that of remediation, particularly digital remediation of collection objects. Originally a play on the version of the term that means to cure or remedy something, remediation was first used in media studies by Paul Levinson to describe the creation of new media as an evolutionary process wherein new media "improve upon or remedy prior technologies."[29] In this study, I disregard the myth of the "innovation journey" of single track developments of technological evolution as proposed in this definition and, instead rely on a less value-laden definition of remediation, which is simply "the representation of one medium in another."[30] In a modified version of Jay David Bolter and Richard Grusin's definition of remediation, which is "the formal logic by which new media refashion prior media," I refer to "remediations, composed of a variety of processes and materials," as the resulting performances of enactments transferred from one type of medium to another.[31]

Gorzalski, "Archivists and Thespians: A Case Study and Reflections on Context and Authenticity in a Digitization Project," *The American Archivist* 79, no. 1 (2016), https://doi.org/10.17723/0360-9081.79.1.161.

[28] Bearman, "Multimedia Computing and Museums: Technology, Knowledge, Representation and Cultural Heritage," in *Selected Papers from the Third International Conference on Hypermedia and Interactivity in Museums*, ed. David Bearman (Pittsburgh, PA: Archives & Museum Informatics, 1995), i.

[29] Levinson, *Human Replay: A Theory of the Evolution of Media* (Ann Arbor: New York University, 1979); Bolter and Grusin, *Remediation:Uunderstanding New Media* (MIT Press, 1999).

[30] Sampsa Hyysalo, Neil Pollock, and Robin Williams, "Method Matters in the Social Study of Technology: Investigating the Biographies of Artifacts and Practices," *Science & Technology Studies* 32, no. 3 (2019), https://doi.org/10.23987/STS.65532, 4; "remediation."

[31] Bolter and Grusin, *Remediation*, 273; Alison Langmead, "Art and Architectural History and the Performative, Mindful Practice of the Digital Humanities." *Journal of Interactive Technology & Pedagogy* 12

1.4 Cases

Museum scholar and practitioner Samuel Alberti notes that museums are "vessel[s] for the bundle of relationships enacted through each of the thousands of specimens on display and in store."[32] These bundles of relationships found in the display and use of museum objects make particularly fruitful avenues for the investigation of sociomaterial affordances. In this dissertation, I employ an approach known as Biographies of Artifacts and Practices (BOAP) to examine three cases of digitally remediated object enactments at the Carnegie Museum of Natural History, the Carnegie Museum of Art, and the Andy Warhol Museum.

1.4.1 Live Animal Encounter and the Carnegie Museum of Natural History

Since 2017, the Carnegie Museum of Natural History has offered an onsite program called Live Animal Encounters (LAE).[33] In these daily onsite encounters, a selection of living animals from the museum's Living Collection are presented in a succession to a theater of museum visitors with narration provided by an animal handler about the animal's story and facts about their species with interludes into to the impact that humanity has had on the animal and the species. These presentations feature animals from around the world including several that are native to

(February 21, 2018), https://jitp.commons.gc.cuny.edu/art-and-architectural-history-and-the-performative-mindful-practice-of-the-digital-humanities.

[32] Samuel J. M. M. Alberti, "Objects and the Museum," *Isis* 96, no. 4 (December 2005): 561, https://doi.org/10.1086/498593.

[33] Kathleen Bodlenos, "Carnegie Museum of Natural History Home to Rescued Animals." Carnegie Museum of Natural History press release, August 16, 2017, https://carnegiemnh.org/press/carnegie-museum-natural-history-home-rescued-animals.

Pennsylvania. LAE programs were moved online during the Covid-19 pandemic-induced museum closures using the Zoom video conferencing software program.

The biographical investigation of the onsite LAE and their transition into Virtual LAE traces their situatedness in the imperialist history of natural history museums who, as one of Western industrial society's versions of folklore, serve as storytellers that reflect the tensions between art and science, education and entertainment, and preservation and exhibition in our modern-day societies to demonstrate how they are embedded in constructed versions of nature. Embedded in these museum natures, the living animal enactments are performed within institutions of denaturalization and perceived intimacy that have shaped their existence and design. However, when they became Virtual LAE, many of the affordance relationships that account for the historical, situational, and experiential aspects of the enactment were not evaluated nor transferred while others were transformed in ways that were not anticipated by the staff who facilitate LAE.

1.4.2 The Online Exhibition Series as the Carnegie Museum of Art

Instead of adapting an onsite program for online enactment like LAE, the curatorial staff at the Carnegie Museum of Art (CMOA) took advantage of the pandemic restrictions by creating a type of series they had never attempted before: an online series of video art.[34] The Online Exhibition Series is a series of video artworks selected by the curatorial team to be experienced on a personal computer by visitors to the museum's website. The videos are uploaded to the Vimeo video hosting and sharing platform then embedded into a webpage on the museum's website that

[34] I have modeled my capitalization of the institutions throughout this document on the institution's use.

includes text about the artwork, the artist, the series, and links to supplementary content created by the education staff.

When video art came into art institutions as a controversial medium, it was regarded as an intangible, democratizing force by artists and an unwieldy, coercive nuisance by many in art institutions. CMOA was one of the first major art museums in the United States to actively support film and video. In the past couple of decades, however, CMOA has had a mixed relationship with time-based media. This move to "better amplify" the museum's film and video collection through the Online Exhibition Series is a case that demonstrates the sensory complications of an object built to emanate and the shifting affordances of digital media in an art museum setting.[35]

1.4.3 *Time Capsule 21* at the Andy Warhol Museum

Andy Warhol's *Time Capsule 21* is one part of a whole artwork consisting of 610 brown cardboard boxes filled with "selected items from the daily flood of correspondence, magazines, newspapers, gifts, photographs, business records, and material that passed through his hands."[36] Originally remediated as an online exhibit that displayed rich, interactive multimedia content using Flash Player software, the *Time Capsule 21* online exhibit had to be migrated and re-envisioned when Flash Player's "End-of-Life" date was announced in 2017.[37] Shaped by archival exhibition and outreach sensibilities along with unique collection restrictions, the JavaScript version available

[35] Hannah Turpin, interview with author, January 14, 2021.

[36] "Lessons Unit: Time Capsule 21 Activity: A Day in the Life of Warhol," Andy Warhol Museum, accessed June 30, 2022. https://www.warhol.org/lessons/time-capsule-21-activity.

[37] "Adobe Flash Player EOL General Information Page," Adobe Flash Player, Adobe, last modified January 13, 2021, https://www.adobe.com/products/flashplayer/end-of-life.html. Adobe announced a 2020 EOL for Flash Player in 2017. They discontinued support for the platform on December 31, 2020.

on the museum's website during the pandemic was a curated selection of items representative of themes found inside the box and across Warhol's oeuvre.

The case of *Time Capsule 21* at the Andy Warhol Museum illustrates how object enactments can blur boundaries both onsite and online resulting in an ambiguous remediated identity. While the other two cases in this study are entrenched in the historical politics and motivations of traditional museum types and decades of institutional baggage shaping how the enactments were produced, Warhol's *Time Capsule* project is in a single-artist institution which allows it to be categorized as a serial artwork but varyingly treated as an archival collection when the need of those working with the capsules arises or the objects' materialities force a shift one way or the other. This case demonstrates how object liminality in a single-artist museum supports flexibility and encourages contextualization in a digital setting, and how these affordances also constrain the enactment because the lack of boundaries inhibits the persistence of identity.

2.0 Review of the Literature

This dissertation is a study of digital remediation practices in museums through a sociomaterial lens. Because of this focus, I place this research at the intersection of sociomaterial affordances and digital practices in museums. With these themes in mind, the literature review begins with a discussion of the meaning of materiality and sociomaterial affordances in the digital age that has provided the theoretical shape to my research. I subsequently explore the interdisciplinary and wide-ranging research regarding the context under investigation of museum objects and digital cultural heritage projects to situate this work as a study of digital museum practices. I conclude the chapter with a discussion of the contributions of this research to the literature on sociomateriality and museum practice through my investigation of the affordances of remediation. This chapter lays a foundation for investigating the nature and impact of digital remediations of object enactments.

2.1 Im/materiality in the Digital Age

The corpus of literature on materiality is rooted in age-old debates on the dualism between the superficial economic pursuits of material things and the spiritual and intellectual realms of the elite. Religions and societies across time and space have urged transcendence from our material illusions. They have claimed that our material constraints can and should be overcome in favor of a superior state of immateriality. Anthropologist Daniel Miller notes that "the definition of humanity has often become almost synonymous with the position taken on the question of

materiality."[38] Similarly, western philosophical tradition has remained indebted to or trapped by, as Harvard humanities professor Jennifer Roberts asserts, Plato's dualism of materialism and idealism.[39]

The dawn of ubiquitous computing technologies and networked communications further complicates materiality discussions by moving digital bits into the exalted position of immaterial superiority. In popular culture as well as in more technical areas, it has become commonplace to assume that the 1s and 0s of bits exist free of material constraints. From the metaphysical promise of a disembodied consciousness through telegraphy to the freedom from industrial society's materialism boasted by cyberspace disciples, the information age has been celebrated for its immateriality.[40] The shift toward an information society is often "framed as a shift from material objects to digital equivalents" and an idealized "substitution of bits for atoms."[41]

The independence from "the shackles of matter," as contested in informatics and encryption specialist Jean-François Blanchette's argument of computing as a material process, would undoubtedly offer benefits if such a state were possible.[42] Several of these benefits are promoted in the declaration of cyberspace independence by cyberlibertarian activist and founding member of the Electronic Frontier Foundation John Perry Barlow. In his popular response to the Telecommunications Act of 1996, particularly concerning the Communications Decency Act bundled within, Barlow suggested that the supposed immateriality of cyberspace freed us from the

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[38] Miller, "Materiality," in *Materiality*, ed. Daniel Miller (Durham, NC: Duke University Press, 2005), 2.

[39] Roberts, "Things: Material Turn, Transnational Turn," *American Art* 31, no. 2 (2017): 69. https://doi.org/10.1086/694067.

[40] Shawn Rosenheim, *The Cryptographic Imagination: Secret Writing from Edgar Poe to the* Internet (Baltimore: Johns Hopkins University Press, 1997), 90; John Perry Barlow, "A Declaration of the Independence of Cyberspace Electronic Frontier Foundation, John Perry Barlow Library. February 8, 1996. https://www.eff.org/cyberspace-independence; Nicholas Negroponte, *Being Digital* (Vintage Books, 1996).

[41] Dourish, *The Stuff of Bits*, 3.

[42] Blanchette, "A Material History of Bits," *Journal of the American Society for Information Science and Technology* 62, no. 6 (2011):1042-57, https://doi.org/10.1002/asi.21542.

tyranny of industrial world governments in stating that governments' "legal concepts of property, expression, identity, movement, and context do not apply to us. They are all based on matter, and there is no matter here."[43] He argued that the government can have no power without real estate and immaterial bits cannot be realized as property. Nicholas Negroponte, the founder of MIT's Media Lab, also supposed that the error correction and data compression features of digital bits would beneficially allow for new economic models and content origins to emerge.[44]

These fantasies about sovereign cyberspace, a ponderance of the no-thing-ness of digital information transfer, and the acknowledgement of the importance of such manifestos in the early days of the digerati aside, it has become clear that materiality is indeed an imposing force on the digital world. Materiality, even when the physical aspects are well-hidden so as to feel transparent or common to the point of ubiquity in digital interfaces, is foundational to the information society. As scholars like Matthew Kirschenbaum and Shannon Mattern have pointed out, the "cloud" exists on physical servers, high-speed internet depends on physical cables, and our computational machines are in constant modes of writing and rewriting via physical means at a microscopic level.[45] Though Negroponte's prophesized shift from the unwieldy atoms of analog media to the instant digital transferability via light did indeed come to fruition, this study aligns with those who deem it damaging to think of this "fungible, fluid, rapidly re-inscribable digital code [as] an

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[43] Barlow, "Declaration of the Independence of Cyberspace."

[44]Negroponte, *Being Digital*. My summary of Barlow's manifesto and Negroponte's is not necessarily fair. Neither were completely naïve about the ties between digital and material and, in another setting, I would argue that Negroponte's *Being Digital* is an outline of all materialities of bits (which is especially apparent in his discussions of copper versus fiber). However, their popularity and outspokenness about material freedom positions them as entry points to pervasive material misconceptions.

[45] Kirschenbaum, *Mechanisms: New Media and the Forensic Imagination* (Cambridge, MA: MIT Press, 2008). https://muse.jhu.edu/journals/leonardo/v041/41.5.baetens.html; Mattern, *Code and Clay, Data and Dirt* (Minneapolis: University of Minnesota Press, 2017).

immaterial medium."[46] By doing so, we neglect highly consequential material aspects of digital products and "hidden costs of computing" like negotiations between software, hardware, interfaces, and the people who access them that affect sustainability and experience.[47]

Researchers studying human-computing interaction, particularly the design of interfaces and artifactual technologies, have notably had to confront the physical materiality of bits head-on during the field's shift from thinking of computers as black-boxed tools toward an acknowledgment of computational materials as mediating factors, especially as "new," "smart," or "computational" materials come to the fore of interaction design.[48] Heekyoung Jung and Erik Stolterman, with others, argue that there has been too much emphasis on intangibility in functional design methods resulting in unsustainable design practices that do not take into account the increasing scarcity of precious materials in technologies and the effects chosen materials have on user experience.[49] They argue that this disregard for the physical aspects, especially bearing in mind "new" or "smart" materials that blur software and hardware boundaries that make this disregard palpable, has stunted human-computer interaction research and digital artifact design by overlooking the material interconnectedness within ecologies (both natural and social) of information interaction. Instead, these researchers insist on design from an artifact ecology

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[46] Johanna Drucker, "Performative Materiality and Theoretical Approaches to Interface," *DHQ: Digital Humanities Quarterly* 7, no. 1 (2013), http://www.digitalhumanities.org/dhq/vol/7/1/000143/000143.html.

[47] Rob Kling and Roberta Lamb, "IT and Organizational Change in Digital Economies: A Socio-Technical Approach," *ACM SIGCAS Computers and Society* 29, no. 3 (1999): 20, https://doi.org/10.1145/572183.572189.

[48] Mikael Wiberg et al., "Materiality Matters-Experience Materials," *Interactions* 20, no. 2 (March 1, 2013): 54–57, https://doi.org/10.1145/2427076.2427087.

[49] Jung and Stolterman, "Material Probe: Exploring Materiality of Digital Artifacts," *TEI '11: Proceedings of the Fifth International Conference on Tangible, Embedded, and Embodied Interaction* (January 2011): 153-56, https://doi.org/10.1145/1935701.1935731; Jung, Eli Blevis, and Stolterman, "Conceptualizations of the Materiality of Digital Artifacts and Their Implications for Sustainable Interaction Design," in *Proceedings of the Design Research Society DRS2010 Conference* (Montreal, CA: Design Research Society, 2010); Jung, et al., "Toward a Framework for Ecologies of Artifacts: How Are Digital Artifacts Interconnected within a Personal Life," *NordiCHI '08: Proceedings of the 5th Nordic Conference on Human-Computer Interaction, Building Bridges* (October 2008): 201-10, https://doi.org/10.1145/1463160.1463182.

perspective that recognizes the physical, interactional, functional, and informational layers within each object and between object relations.[50]

Researchers in information science have also recently explored how the digital is very much attached to physical constraints by examining the movement of information between people and systems, known as information flow, and the situatedness of information practices per object and environmental factors. In their study of information technologies in mobile work practices, Mohammed Jarrahi and Sarah Nelson have found that the technologies become their own sort of environmental configuration for mobile knowledge workers.[51] Given these workers' nomadic practices, they create functioning assemblages of digital technologies to allow degrees of consistency and adaptability across space and time. These mobile offices, however, "simultaneously present design-driven, local, organizational, and temporal technological constraints that require mobile knowledge workers to engage in 'configuration work' to make information technologies function effectively."[52] Thus, the technologies' materialities that enable and constrain possibilities, their affordances in other words, are dependent on the circumstances of configuration along with the material conditions of the objects themselves.

In an article on the generation, movement, and use of data, Jo Bates employs Paul Edwards's concept of "data friction" to show how even the metaphors we use to discuss technologies support the idea that various social and material actors negotiate movements of data through infrastructural, sociocultural, and regulatory means.[53] Since slowing down and inhibiting

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[50] Jung et al., "Ecologie of Artifacts," 208.

[51] Jarrahi and Nelson, "Agency, Sociomateriality, and Configuration Work," *Information Society* 34, no. 4 (2018): 244-260, https://doi.org/10.1080/01972243.2018.1463335.

[52] Jarrahi and Nelson, "Agency, Sociomateriality, and Configuration Work," 244.

[53] Jo Bates, "The Politics of Data Friction," *Journal of Documentation* 74, no. 2 (2018): 412-29, https://doi.org/10.1108/JD-05-2017-0080.

movement are possible modes of data interaction, this research shows that digital data, too, is necessarily tied to material affordances. Data friction, which is only possible if the digital is material, "influences what data are captured and how they are, or are not, made accessible and re-usable by different social actors, and ultimately how data movements are bringing social actors into new and complex forms of relation with one another."[54]

Literature regarding methods for investigating sociomateriality of digital objects frequently refers to Matthew Kirschenbaum's forensic and formal aspects of media to describe digital media's physical qualities.[55] I offer it here as a practical way of understanding the physicality of digital materiality and one that guides how this study approaches degrees of materiality in museum objects. Using forensic science as a model, particularly Edmond Locard's exchange principle that "every contact leaves a trace," Kirschenbaum's forensic materiality refers to the physical evidence of interaction that can be detected through the identification and analysis of various traces, residues, marks, and inscriptions. "Forensic materiality rests upon the principle of individualization," which means that, given we have the instrumentation to look close enough, there are no two physical things that are exactly the same.[56] This includes the obviously tangible things like computer mice and cables along with the bit patterns magnetized or cut into a computer disk. Forensic materiality exposes traces of production, distribution, reception, and preservation. Formal materiality engages with the architecture and symbolic form of the data object or the imposition of multiple-relational computational states on a data set or digital object. Formal materiality concentrates on the structure and presentation of the digital environment, which Kirschenbaum defines as "an abstract projection supported and sustained by its capacity to

[54] Bates, "Politics of Data Friction," 425.
[55] Drucker, "Performative Materiality"; Kirschenbaum, *Mechanisms*.
[56] Kirschenbaum, *Mechanisms*, 10.

propagate the illusion (or call it a working model) of immaterial behavior: identification without ambiguity, transmission without loss, repetition without originality."[57]

As Kirschenbaum's work calls attention to the materiality of physical substrates in computing, Johanna Drucker proposes two additional facets of sociomateriality: distributed and performative material concerns. The concept of distributed materiality, originally from Jean-François Blanchette, asserts the "co-dependent, layered contingencies on which the functions of drive, storage, software, hardware, systems, and networks depend."[58] A focus on distributed materiality is a focus on the "complex of interdependencies on which any digital artifact depends for its basic existence."[59] Drucker's performative materiality then "recognizes how the technical, physical conditions of [an object] are produced as an event."[60] Performative materiality argues that "what something is has to be understood in terms of what it does, how it works within machinic, systemic, and cultural domains."[61] Drucker argues that in order to understand everything that an enactment *is,* we have to be able to understand all the features that make the event possible like the creators, viewers, media, materials, contexts, etc. Although both Kirschenbaum and Drucker refer explicitly to digital materiality in these approaches, I use them to frame conceptions of sociomateriality in this study for both non-digital and digital objects. In this study, the forensic, formal, distributed, and performative material dimensions of non-digital objects are considered as they are remediated into digital spaces to identify shifts in sociomaterial affordances.

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[57] Kirschenbaum, *Mechanisms*, 11.
[58] Drucker, "Performative Materiality."
[59] Drucker, "Performative Materiality."
[60] Juhee Park and Anouska Samms, "The Materiality of the Immaterial: Collecting Digital Objects at the Victoria and Albert Museum," *MW2019: Museums and the Web 2019* (2019), https://mw19.mwconf.org/paper/the-materiality-of-the-immaterial-collecting-digital-objects-at-the-victoria-and-albert-museum.
[61] Drucker, "Performative Materiality."

2.2 Sociomaterial Affordance

In this study, I assume materiality to be "the nature of the substrates and the properties that constrain and condition the… encounter."[62] It is the idea that specific material configurations have consequences on what we can ask and do with those configurations.[63] Material properties constrain, enable, limit, and shape the possibilities for information creation, transmission, manipulation, and use. Furthermore, as opposed to approaches where the human and the social are separated from the material and the technical as ontologically distinct entities, this sociomaterial approach to properties and affordances holds that practices in the social world are both relational and "about the physical stuff caught up and shaped in those relations."[64] As organizational theorist Wanda Orlikowski states, "the social and the material are considered to be inextricably related — there is not social that is not also material, and no material that is not also social."[65]

Paul Dourish and Melissa Mazmanian provide a foundation for thinking of how material consequences are created and shaped through interaction while allowing for properties of materials to remain part of the digital materiality discussion. It is their definition that I use as a foundation for this study's version of materiality:

> In talking of materiality here, we want to go beyond the brute fact of material manifestation. That is, what is of interest to us is not simply the fact that apparently abstract and ineffable digital "stuff" actually takes material form; rather, we want to understand the particular material properties of these forms and their consequences for how people encounter, use,

[62] Dourish, *The Stuff of Bits*, 6.
[63] Orlikowski, "Sociomaterial Practices."
[64] Law, "Material Semiotics," 1.
[65] Orlikowski, "Sociomaterial Practices," 1437.

and transform them. Particular material properties might include mutability, persistence, robustness, spatiality, size, durability, flexibility, and mobility. Information practice arises in conversation with these specific properties of information and its material forms.[66]

Their approach to materiality recognizes the entanglement of material and symbolic concerns as conversations between properties and forms, while also privileging a sociomaterial angle of interaction. It suggests that a study of both "the material forms in which digital data are represented and how these influence interpretation and lines of action" is the most accurate and applicable.[67] Related to James Gibson's theory of affordances, which claims that an object's properties support or restrict particular actions, this approach explores the idea that representations, or material arrangements, of information have a significant impact on our experience. [68] These arrangements shape how and where data can be stored, how quickly it can be moved or transferred, the ease of access, and so on, which alters what we can ask from that information and our collection choices.

For example, Dourish refers to the invention of vertical filing systems to illustrate these conditions' possible consequences.[69] The laws of physics, the physical features of paper, and the social practices of files/filing allow certain actions to occur like separation by type and grouping of categories into piles. Vertical filing, however, supports those features with the revolutionary addition of random access capabilities, a precursor to our computational technologies today. Another example is media theorist Lisa Gitelman's discussion of the inseparability of material

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[66] Dourish and Mazmanian, "Media as Material: Information Representations as Material Foundations for Organizational Practice," in *How Matter Matters: Objects, Artifacts, and Materiality in Organization Studies*, ed. Paul R. Carlile, Davide Nicolini, Ann Langley and Haridimos Tsoukas (Oxford: Oxford University Press, 2013).

[67] Dourish, *The Stuff of Bits*, 49.

[68] Gibson, "The Theory of Affordances."

[69] Dourish, "Towards a Materiality of Information (CS Seminar Lecture Series)," filmed March 30, 2012 in Blacksburg, VA, VTechWorks video, 1:02:50, http://hdl.handle.net/10919/19045.

form from the significance of documents.[70] A digital PDF form with fillable blanks, for instance, and a paper-based form with fillable blanks can be conceived as fulfilling the same standardization and data capturing objectives.

However, when we look more closely at how actions are modified in each format, we see material consequences in their differences. In the former, the designation of the blanks and the order of operations can be more strictly defined and enforced owing to the digital rigidity (barring a user who actively seeks to hack these restrictions). Whereas the latter encourages a similar definition and enforcement yet has fewer features for barring non-prescriptive use. One can simply write wherever they choose, add notations, and refuse to complete portions at ease. These choices indeed impact the value of the form insofar as its intended use, but the physical affordances are such that these choices are more readily at-hand than in a digital format. In both examples, the physical materials have qualities that transfer across contexts and have different actionable or consequential qualities.

In this way, information must always be mediated materially to be communicated. Sociologist James-Allen Robertson argues that a software object might be considered more of a process or performance, but that process must still be transcoded somewhere and inscribed on/in something for it to persist, act, and be acted upon.[71] Computer scientist Paul Eggert contends, specifically about text-based communication, “whether the textual carrier be the physical page, a

[70] Gitelman, *Paper Knowledge* (Durham: Duke University Press, 2014).

[71] James Allen-Robertson, "The Materiality of Digital Media: The Hard Disk Drive, Phonograph, Magnetic Tape and Optical Media in Technical Close-Up," *New Media & Society* 19, no. 3 (2017): 458, https://doi.org/10.1177/1461444815606368..

computational capacity, or the sound waves that transmit orally declaimed verse, there is always a material condition for the existence of text."[72]

"Material" for Dourish and Mazmanian encompasses two related meanings: that which takes physical form and that of consequence. In other words, that which carries material consequences is always also physical and that which is physical occasions material consequences.[73] N. Katherine Hayles' early 2000s work has a similar effect to Dourish and Mazmanian from a literary studies perspective. Hayles, a prominent voice in the discussion of the physical and material affordances of digital objects, claims that the meaning of a work cannot be separated from physical manifestation.[74] Her approach to materiality suggests that we think of texts, which I translate into content, as embodied entities that mobilize certain aspects of their physicality. Thus, the materiality of an object is emergent and negotiable considering the content being enacted and the context of the enactment. However, semi-durable physical properties do exist in physical instantiation. The context of the given instantiation simply shapes whether those physical properties are consequential and in what ways. This definition encourages interplay between all aspects of material concern while allowing for certain qualities to emerge in the effects of mediation.

I doubt that Hayles would use the word "essential" as it is wrought with determinist assumptions that posthumanists tend to avoid.[75] I use it here to draw attention to Hayles' idea that there are fundamental physical properties of certain materials that allow us to avoid a theoretical

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[72] Eggert, "Text-Encoding, Theories of the Text, and the 'Work-Site'," *Literary and Linguistics Computing* 20, no. 4 (2005): 428, https://doi.org/10.1093/llc/fqi050.

[73] Dourish and Mazmanian, "Media as Material."

[74] Hayles, "Translating Media: Why We Should Rethink Textuality." *The Yale Journal of Criticism* 16, no. 2 (2003): 263-90. https://doi.org/10.1353/yale.2003.0018.

[75] Many of the scholars I cite in this review actively argue against technological determinism and essential material properties. Though I agree in theory with this approach, I will be arguing for some consideration of essential properties in the final chapter for practical reasons.

"chaos of infinite difference,"[76] but do not intend all out determinism. Sociologist Susan Leigh Star, alluding to Judith Butler, directly relates these consequences to possibilities of action in stating that material conditions "refer to durable arrangements that have consequences on the trajectory of action."[77] This "flickering durability" provides enough consistency that an object can be categorized and called into conversation while recognizing that all these factors are subject to sociomaterial relationships.[78] In the same manner, key science and technology scholars Wiebe E. Bijker and John Law describe this entanglement through their conception of technologies:

> Technologies do not have a momentum of their own at the outset that allows them, as Latour has put it, to pass through a neutral social medium. Rather, they are subject to contingency as they pass from figurative hand to hand, and so are shaped and reshaped. Sometimes they disappear altogether: no-one felt moved, or was obliged, to pass them on. At other times they take novel forms, or are subverted by users to be employed in ways quite different from those for which they were originally intended.[79]

Examining sociomateriality requires considering the co-production of physical and social elements to understand material affordances and constraints. As sociologist Ian Hutchby contends, another scholar working from Gibson's affordances, "affordances are not exclusively properties of people or of artifacts – they are constituted in relationships between people and the materiality of the things with which they come in contact."[80]

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[76] Hayles, "Translating Media," 277.

[77] Susan Leigh Star, "Revisiting Ecologies of Knowledge: Work and Politics in Science and Technology," in *Boundary objects and beyond: Working with Leigh Star*, ed. Geoffrey C. Bowker et al. (Cambridge: MIT Press, 2015), 29.

[78] Hayles, "Translating Media," 276-77.

[79] Bijker and Law, "General Introduction," in *Shaping Technology/Building Society Studies in Sociotechnical Change*, ed. Wiebe E. Bijker and John Law (Cambridge, MA: MIT Press, 1992), 8.

[80] Hutchby in Paul M. Leonardi, "View of Digital Materiality? How Artifacts without Matter, Matter," *First Monday* 15, no. 6-7 (2010), https://firstmonday.org/article/view/3036/2567.

2.3 Museums, Objects, and the Web

The affordances examined in this study are constituted in the relationships between museum practitioners and institutional histories, museum objects, and the mediation strategies employed to enact the objects for museum purposes. Of particular concern are the changes in affordances when non-digital objects are remediated online using information and communication technologies (ICTs), a concern that places this dissertation in the literature regarding how ICTs have impacted museums' roles and values. Many of these concerns are echoed in the object biographies conducted as the core of this research.

2.3.1 Rethinking Authentic Objects

A major thread throughout discussions of ICTs and museums is the shifting sands of authority. When electronic technologies were first used in 1950s museum galleries, they were seen by many museum professionals as augmentative features that enabled a personalized and deeper experience with the museum objects on display.[81] Mostly in the form of handheld audio guides, the first of which being the Short-Wave Ambulatory Lectures at Amsterdam's Stedelijk Museum in 1952, these technologies proliferated into visitor-oriented multimedia features being expected in museums by the 1970s.[82] Technologies that were intended to "highlight the significance of the artifact by providing contextual, historical, or theoretical information, thereby complementing and

[81] Loïc Tallon, "Introduction: Mobile, Digital, and Personal," in *Digital Technologies and the Museum Experience: Handheld Guides and Other Media*, ed. Loïc Tallon and Walker Kevin (Lanham: AltaMira Press, 2008), xiii-xvii.

[82] Tallon, "Mobile, Digital, and Personal," xiii.

strengthening the complete museum experience."[83] The zeitgeist of computers had infiltrated the museum world as museum professionals and visitors, enchanted by the prospects of more participatory experiences encouraged by technological interactivity, began to expect technological intervention during their museum experience.[84]

Excitement spread through the museum communities after the World Wide Web made its debut in the early 1990s with museum website counts jumping from 120 in 1995 to over 400 within a year, but this enthusiasm was quickly complicated by a new reality of distributed, collaborative, and, thus, negotiated authority.[85] Theoretically, this shift had already begun with the poststructuralist and postmodernist movements toward contesting authority in favor of multi-faceted interpretations, but it was the sociomaterial possibilities embedded in ICTs that made these movements concrete for museums.[86] The museum sector "has been slow to respond to the 'digital turn.' Despite more than 40 years of engagement with the 'database' and its impact on collections management and documentation practices, the sector has had difficulty in coming to terms with the shifting sands of its own authority."[87]

Historically, the discussions of authority in museums are based on a foundation of ownership of authentic material things.[88] Related to Walter Benjamin's concept of the "aura" posed in response to the proliferation of mechanical reproductions, the belief in authenticity suggests that there is something about the original work, its productions, its techniques, its place

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[83] Stephanie Eva Koester, *Interactive Multimedia in American Museums* (Pittsburgh: Archives and Museum Informatics, 1993), 4. https://www.archimuse.com/publishing/interactive_multimedia.html.

[84] Kenneth Hudson, *Museums for the 1980s: A Survey of World Trends* (London: Macmillan, 1977), 77.

[85] Robert Cailliau, "A Little History of the World Wide Web," World Wide Web Consortium, last modified August 1, 2021, https://www.w3.org/History.html; Keene, "Becoming Digital," 299.

[86] Horwood, *Sharing Authority in the Museum.*

[87] Sebastian Chan, "Foreword," in *Performing Digital: Multiple Perspectives on a Living Archive*, ed. David Carlin and Laurene Vaughan (London: Routledge, 2015), xv-xix.

[88] Ross Parry, "Introduction to Part Five," in *Museums in a Digital Age*, ed. Ross Parry (Hoboken: Taylor and Francis, 2013), 293-294.

in time and space, that cannot be reproduced.[89] In the marketplace, this concept of genuine objects has had legal and economic consequences as reproductions and innovative technologies frequently disrupt the value of originals.[90] In museums, authenticity has historically been the basis for museums' privileged status as sites of knowledge.[91] They have supposedly held on to their positions of power through the perceived authenticity of museum objects and the trusted expert guidance of museum professionals as a "core value… a legitimating value."[92]

As the story goes, with the dawn of the internet, the World Wide Web, and, now, ubiquitous computing technologies, the technological affordances and constraints of the digital age supposedly displaced the authority of these institutions. The networked communication and publishing possibilities afforded by the web have encouraged a shift from museums being "sole interpreters of their collections" and the authenticity of their objects has been called into question.[93] Afterall, how can you have authentic objects in a realm that, as computer scientist David Levy states about digital environments, includes "no originals (only copies–lots and lots of them) and no enduring objects (at least not yet). This makes assessing authenticity a challenge."?[94] While I present Levy's statement here somewhat facetiously given that many methods for authentication

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[89] Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in *Illuminations*, ed. by Hannah Arendt (New York: Schocken Books, 1969).

[90] Yves Evrard and Anne Krebs, ""The Authenticity of the Museum Experience in the Digital Age: The Case of the Louvre," *Journal of Cultural Economics* 42, no. 3 (2018): 358, https://doi.org/10.1007/s10824-017-9309-x; Anne Marie Hede et al., "Perceived Authenticity of the Visitor Experience in Museums: Conceptualization and Initial Empirical Findings," *European Journal of Marketing* 48, no. 7-8 (2014): 1396, https://doi.org/10.1108/EJM-12-2011-0771.

[91] Witcomb, "The End of the Mausoleum."

[92] Hylland, "Even Better than the Real Thing?" 80.

[93] Jennifer Trant, "When All You've Got Is 'the Real Thing': Museums and Authenticity in the Networked World," *Archives and Museum Informatics* 12, no. 2 (1998): 107. https://doi.org/10.1023/A:1009041909517; Hylland, "Even Better than the Real Thing?" 63.

[94] David M. Levy, *Where's Waldo? Reflections on Copies and Authenticity in a Digital Environment* (Washington DC: Council on Library and Information Resources, 2000), 24, https://www.clir.org/pubs/reports/pub92/levy.

of digital objects like DOIs (digital object identifiers) and more recently NFT (non-fungible tokens), the idea that authenticity escapes or alludes us in the digital age remains a common trope.

Museum educator and cultural historian Lisa Roberts argues that authenticity, as it has been used to place value in non-digital, tangible objects, is an invention of the late nineteenth century; a marketing technique used to fabricate authority, not to uphold it.[95] She and, more recently, cultural historian Ole Marius Hylland argued that the purported displacement of authority has been exaggerated and authenticity shifts have not constituted the end of an era for museum authority nor for authentic objects.[96] In a survey conducted by the American Alliance of Museums (AAM) in 2021 museums were regarded as the second most trustworthy source of information by survey respondents, coming in second only to family and friends in spite of the once claimed "crisis" of digital dematerialization.[97] The second most cited reason for this trustworthiness after their perceived status as fact-based institutions was the presentation of "real/original/authentic objects."[98] According to the public surveyed by the AAM, museums are still considered institutions that share expert knowledge and whose expertise is evidenced by the collection and display of authentic objects.

Research among European and Latin American museology circles provide a more accurate understanding of authenticity in museum objects that may aid in understanding why originality and physicality might not be the key to authority in museums. Museum objects are always mediated both curatorially and physically in the sense that the objects have been removed from

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[95] Roberts, *From Knowledge to Narrative: Educators and the Changing* Museum (Washington DC: Smithsonian Institution Press, 1997).

[96] Hylland, "Even Better than the Real Thing?"

[97] Wilkening Consulting and American Alliance of Museums, *Museums and Trust 2021* (2021), https://www.aam-us.org/2021/09/30/museums-and-trust-2021; Trant, "When all You've Got is the 'Real Thing'," 107-25.

[98] Wilkening Consulting and American Alliance of Museums, *Museums and Trust 2021*.

their original creation/use circumstances and put on display in an inaunthentic environment with interpretive text. In this sense, museum objects have only ever been "authentic" in the sense that they are museum objects, but such a distinction does little to reflect the originality of an object. I invoke the concept of *museum objects*, the concept known as *musealia* in European and Latin American museology, to understand how the nature of museum objects has never been one of authenticity in the sense that is often espoused in the literature.[99] Essentially, the concept is that things become particular types of objects when they are brought into museum practice. A thing turned museum object goes through the process of musealization by which it is extracted "physically or conceptually…from its natural or cultural environment" to become an object that "document[s] some represented reality in another context."[100]

Kiersten Latham, a museum studies scholar grounded in library and information science, compares the concept of musealia to documents in documentation studies: museum objects act as documents of where they came from but they also become documents of the situation in which they are recontextualized.[101] They "accrue meaning" as their context changes and they go through processes of selection and display.[102] With this understanding, the authenticity of museum objects does not necessarily mean that the objects have to be originals, copies are often employed as faithful substitutions for the realities they are meant to represent, but that they are displayable objects that provide evidence of something else–cultural or natural, usually both.[103] Through this thinking, any object displayed in a museum, whether originals, facsimiles, surrogates, etc., is

[99] Latham, "Jungles, Rabbit Holes, and Wonderlands."
[100] Desvallées and Mairesse, *Key Concepts of Museology*, 50; Latham, "Jungles, Rabbit Holes, and Wonderlands."
[101] Latham, "Jungles, Rabbit Holes, and Wonderlands."
[102] Alberti, "Objects and the Museum," 565; Desvallées and Mairesse, *Key Concepts of Museology*, 51. Musealia need not be attached to a museum, but all objects in a museum are musealia.
[103] Desvallées and Mairesse, *Key Concepts of Museology*, 64.

considered a substitute for the reality it represents.[104] As ethnographer Jacques Hainard stated of museum objects in 1984, "The object is not the truth of anything. Firstly polyfunctional, then polysemic, it takes on meaning only when placed in context."[105] Through this understanding of museum objects then, their identity need no longer be tied to reinforcing imperialism conceptions of authority. Instead, the "principal mission of museums is to transform things into objects" and, in doing so they can produce objects that are equally authentic in the digital age.[106]

2.3.2 Tensions in Digital Affordance

However useful it may be to allay fears of a digital attack on museum authority for the sake of sociomaterial understandings of museum objects in this dissertation, there remain practical considerations of what we can and should expect from "becoming digital" that have consequences on how museum objects function in research, exhibition, and programming.[107] Whether handwritten on a sheet of parchment, magnetized in iron-oxide coating, or embedded in the sound waves produced by vocal cord vibrations and carried through the air, all information must be mediated to be communicated. This much is obvious, yet some practices in collecting institutions overlook how the mediating techniques shape the available possibilities and the eventual experience with the objects.[108] Additionally, though introduction of networked communications

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[104] Bernard Deloche, *Le Musée Virtuel: Vers une Ethique des Nouvelles Images*, trans. author. (Paris: Presses Universitaires de France, 2001).

[105] Kaehr Hainerd in Desvallées and Mairesse, *Key Concepts of Museology*, 50.

[106] Espacio Visual Europa, "Museum Object or Musealia," *Museums+Innovation* (blog). *EVE Museology*, August 11, 2015, https://evmuseography.wordpress.com/2015/08/11/museum-object-or-musealia.

[107] Keene, "Becoming Digital."

[108] Maryanne Dever, "Provocations on the Pleasures of Archived Paper," *Archives and Manuscripts* 41, no. 3 (2013): 238-47; Krista McCracken"Archival Digitization and the Struggle to Create Useful Digital Reproductions," *History on the Internet* (blog), *Active History*, January 6, 2014, https://activehistory.ca/2014/01/archival-digitization-and-the-struggle; Rekrut, "Matters of Substance," 173-82; https://doi.org/10.1080/01576895.2013.841550; Samantha Thompson, "Why Don't Archivists Digitize Everything?"

technologies may not be the nemesis it could have been, many of its affordances are at odds with the idea of the museum as singular, physical, and aggregating.[109]

This means that mediation through online technologies requires fundamentally different practices and understandings about the uniqueness of these objects and the experience museums can expect to provide. The literature regarding these practices is interdisciplinary and extensive, impacting the general public as well as research practices across the globe. Pulling from research across the cultural heritage sector regarding the affordances of ICTs and alluding to why digital objects may still be considered less authentic, I outline broad tensions found in this research before moving onto responses to these tensions that have shaped my research in the final section of this chapter.

2.3.2.1 Enhanced Reach at the Cost of Context

ICTs have become common features in the museum landscape in both back-of-house needs like collection maintenance and in-house communication, as well as front-of-house uses such as public communication, research initiatives, education, and exhibition.[110] Early on, these technologies were recognized as productive ways to extend the reach of cultural heritage institutions to new audiences across the networked world. As early as 1995, these institutions recognized that "online resources had the potential to reach millions."[111] According to a 2013 Pew

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Archives @ PAMA (blog), Peel Art Gallery Museum and Archives, May 31, 2017, https://peelarchivesblog.com/2017/05/31/why-dont-archivists-digitize-everything.

[109] Ross Parry, "Introduction to Part Two," in *Museums in a Digital Age*, ed. Ross Parry (Hoboken: Taylor and Francis, 2013), 120.

[110] Getty Foundation, *Museum Catalogues in the Digital Age: A Final Report on the Getty Foundation's Online Scholarly Catalogue Initiative* (Los Angeles: Getty Foundation, 2017), www.getty.edu/foundation/osci-report.; Natasha Stroeker and René Vogels, *Survey Report on Digitisation in European Cultural Heritage Institutions 2014*, ENUMERATE, January 2014, https://www.egmus.eu/fileadmin/ENUMERATE/documents/ENUMERATE-Digitisation-Survey-2014.pdf.

[111] Gelfand, "If We Build It," 69.

Research Center report, 78 percent of arts organizations said that digital communication technologies like social media, online exhibitions, online programming, online collections, and websites were "very important" for audience engagement. In some cases, museums have witnessed a surge in online access with "online visits easily surpass[ing] the number of visitors to the museum's physical campus."[112] In 2004, a study conducted by Paul Marty and Michael Twidale found that visitors to museum websites frequently account for five to ten times the number of physical museum visitors.[113] However, in these studies, it is noted that the quality, duration, and depth of interaction is incommensurate with the in person engagement.

Researchers that use these online resources as data sources provide insight as to the benefits of this increased access. Lara Putnam, in perhaps the most referenced work on the topic in recent years, noted that the digitization of source material has "transformed historians' practice in ways that facilitate border-crossing research in particular."[114] With a few typed characters and the click of a button, historians and other researchers gained the ability to conduct primary source research from the comfort of their offices. Museum curators have noted that "we are working across borders. Borders [between] museums, and international borders."[115] Putnam discussed how technological developments like Optical Character Recognition (OCR) enabled full-text searchability and the decrease in costs associated with using these technologies, following the effects of Moore's law, made "large swaths of scholarship accessible via web-based metadata

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[112] Silvia Filippini Fantoni, Rob Stein, and Gray Bowman, "Exploring the Relationship between Visitor Motivation and Engagement in Online Museum Audiences," paper presented at Museums and the Web 2012, San Diego, CA (2012), https://web.archive.org/web/20220121070445/https://www.museumsandtheweb.com/mw2012/papers/exploring_the_relationship_between_visitor_mot

[113] Paul F. Marty and Michael B. Twidale, "Lost in Gallery Space: A Conceptual Framework for Analyzing the Usability Flaws of Museum Web Sites," *First Monday* 9, no. 9 (2004), https://doi.org/10.5210/FM.V9I9.1171.

[114] Putnam, "The Transnational and the Text-Searchable," 377.

[115] Nicole Meehan, "Digital Museum Objects and Memory: Postdigital Materiality, Aura and Value," *Curator: The Museum Journal* (2020): 14, https://doi.org/10.1111/CURA.12361.

search."[116] Putnam's explications provide proof for the affordances David Prown argued for regarding art historical research in 1996, that "the obvious, primary application of the computer to the history of art will be in automated retrieval systems," as Alison Langmead and David Newbury refer in their treatise on computational methods in humanities research.[117] Although surveys of museum visitors do not use the same language, transnational access and ease of accessing "vast amounts of information regardless of where you are" are also recognized as affordances of using online formats from the visitor and museum professional perspective.[118]

But just as early as the extension of reach was touted, professionals working on digital museum projects saw that "nothing about the propositions that museums should extend their potential audience by digitally 're-presenting' their holdings and the knowledge they possess about them is simple; not technologically, culturally or intellectually," as David Bearman, a founding partner of Archives & Museum Informatics, condensed.[119] Thomas Campbell, director and CEO of the Fine Arts Museums of San Francisco, has more recently remarked, "This will be a time of reckoning and reflection for museums trying to substantiate their footing in the digital world. For all the feverish diversity of content now on offer, the digital platform is often facile, superficial, and undiscriminating."[120]

Researchers and practitioners have lamented that the benefits of access often result in a detachment of meaning. Often, this detachment is incurred through the decontextualizing effects

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[116] Putnam, "The Transnational and the Text-Searchable," 379.

[117] Langmead and Newbury, "Pointers and Proxies," in *The Routledge Companion to Digital Humanities and Art History*, ed. Kathryn Brown (New York: Routledge, 2020), 358.

[118] Andrea Bandelli, "Virtual Spaces and Museums," in *Museums in a Digital Age*, ed. Ross Parry (Hoboken: Taylor and Francis, 2013), 148; Hylland, "Even Better than the Real Thing?"

[119] Bearman, "Multimedia Computing and Museums," i.

[120] Adam Koszary, "Has the Digital Museum Finally Come of Age?" *Apollo Magazine*, May 4, 2020. https://www.apollo-magazine.com/digital-museums-today/amp.

of digitization.[121] In some cases, this is because the relationships between digital objects are not immediately, physically perceptible. Where these objects were once stored and presented physically in relation to objects and texts that could imply or denote meaning, their digital representation as singular digital objects visible through the linked arrangement of nested web page results become a sequential experience of singular pages rather than a layered one with multiple dimensions.[122]

Additionally, it is because the digital objects have been deficiently repositioned when put online, usually in terms of provenance information, which can be supplied through descriptive and administrative metadata.[123] Clifford Lynch summarized the problem as being one of distrust with "the fundamental concept of publication in the digital environment – the dissemination of a large number of copies to arbitrary interested parties that are subsequently autonomously managed and maintained."[124] In order to create or reinstill this trust, the assertions "that cluster around the object" must hold up to tests of integrity.[125] Digital copies are often seen as incomplete or lacking in quality.[126] In her research on historians' use of primary sources, Alexandra Chassanoff found that academic historians are often concerned by the value of digital surrogates and opt for accessing the non-digital versions where possible because they know that the integrity of the item is intact, fully accessible, and that other physically situated materials will help provide context.[127]

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[121] Joanna Sassoon, "Photographic Meaning in the Age of Digital Reproduction," Archives & Social Studies: A Journal of Interdisciplinary Research 1, no. 0 (March 2007): 299-319.

[122] Gelfand, "If We Build It," 52.

[123] Lynch, "Authenticity and Integrity in the Digital Environment: An Exploratory Analysis of the Central Role of Trust," in *Museums in a Digital Age*, ed. Ross Parry. (Hoboken: Taylor and Francis, 2013), 314.

[124] Lynch, "Authenticity and Integrity in the Digital Environment," 314-16.

[125] Lynch, "Authenticity and Integrity in the Digital Environment," 315.

[126] Rekrut, "Matters of Substance," 236.

[127] Chassanoff, "Historians and the Use of Primary Source Materials in the Digital Age," *The American Archivist* 76, no. 2 (2013): 469-70, https://doi.org/10.17723/AARC.76.2.LH76217M2M376N28.

Archivist Ala Rekrut argues that our current methods for digital access insufficiently account for the material awareness of the value of experiencing objects in the flesh.[128] Rekrut insists that practitioners, researchers, and the public can "benefit from a greater awareness of materiality" and should develop "material literacy" skills.[129] Merely digitizing objects for posterity, collection management, or for retrieval of the textual content and providing access via under-considered interfaces is a display of material illiteracy. She argues that this process assumes materiality is "a neutral background to [the object's] content" with no obvious recognition of the import of the object's original material consequences.[130] The premise of my dissertation suggests that the same is true for the material consequences of the digital space.

Thomas Padilla and Trever Owens discuss in their article on historical scholarship in the digital age that "this is fine" if your only concern is text, given that the digital environment is one that privileges text.[131] However, many researchers have come to realize that studying a text in full requires also studying its "artifactual," or material, qualities.[132] In terms of a text-based primary object, the handwriting, paper quality, chemical composition of inks, traces of use, and other physical features can all be evaluated to analyze a text more holistically.[133] In a statement that encompasses these concerns, the Modern Language Association claimed, "The advantages of the new forms in which old texts can now be made available must not be allowed to obscure the fact

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[128] Rekrut, "Reconnecting Mind and Matter: Materiality in Archival Theory and Practice," master's thesis, University of Manitoba, 2009, http://hdl.handle.net/1993/3161.

[129] Rekrut, "Reconnecting Mind and Matter," 238.

[130] Rekrut, "Reconnecting Mind and Matter," 238.

[131] Owens and Padilla, "Digital Sources and Digital Archives."

[132] Owens and Padilla, "Digital Sources and Digital Archives."

[133] Kathryn Rudy, "Dirty Books: Quantifying Patterns of Use in Medieval Manuscripts Using a Densitometer," *Journal of Historians of Netherlandish Art* 2, no. 1-2 (2010), https://doi.org/10.5092/jhna.2010.2.1.1; "Where Material Book Culture Meets Digital Humanities," *Journal of Digital Humanities* 1, no. 3 (2012), http://journalofdigitalhumanities.org/1-3/where-material-book-culture-meets-digital-humanities-by-sarah-werner.

that the new forms cannot fully substitute for the actual physical objects in which those earlier texts were embodied at particular times in the past."[134]

2.3.2.2 Online Learning without Design

The introduction of ICTs to museum environments has followed a similar trajectory to multimedia in general and this trajectory is based on the changing identities of museums from collecting institutions to centers for informal learning. Museums who were once consumed with collecting and preserving museum objects for closed circles of research transitioned into dedicating resources toward public education through "cafeteria style" displays for visitors to "educate themselves" during the late 19th and early 20th centuries.[135] In the mid 20th century, society transitioned from the industrial production based economy established during the Industrial Revolution to an economy based upon information technology.[136] During this move, museums became centers for learning and, as technologies and learning models were introduced to the learning ecosystem throughout the second half of the century particularly the constructivist and contextual models, museums continued to follow trends by attempting to create more interactive experiences for museum visitors using onsite multimedia.[137]

These changes were(are) not without controversy. As Ross Parry reminisces, "museums will remember the reticence and suspicion once showed to digital resources and to digital

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[134] "Statement on the Significance of Primary Records," Modern Language Association, accessed June 30, 2022. https://www.mla.org/Resources/Research/Surveys-Reports-and-Other-Documents/Publishing-and-Scholarship/Significance-of-Primary-Records/Read-the-Report-Online/Statement-on-the-Significance-of-Primary-Records-Modern-Language-Association.

[135] Koester, *Interactive Multimedia in American Museums*, 4-6.

[136] John H. Falk and Lynn D. Dierking, *Learning from Museums: Visitor Experiences and the Making of Meaning* (Lanham, MD: AltaMira Press, 2000), 1.

[137] Falk and Dierking, *Learning from Museums*; Elizabeth Merritt, "Museums and Personalized Learning," *Center for the Future of Museums* (blog), American Alliance of Museums, March 22, 2016. https://www.aam-us.org/2016/03/22/museums-and-personalized-learning.

interactives, and how problematic it first seemed to accommodate the 'new media' within environments whose credence was understood to come principally from the presence of genuine, material objects."[138] In natural history museums, these changes were regarded as too radical; forcing a break between the more collection-oriented natural history institutions and the more interactive and hands-on science museums.[139] There was also pushback in art museums from both curators and artists who believed that the works should be felt and experienced, not taught, thus requiring no extended media or even text on labels outside of "tombstone" information.[140]

Against these protestations, progressive views of literacy and participatory models of communication took hold across the educational landscape resulting in more user-centered approaches to exhibition and programming, with "user-centered" often conflated with entertainment and personalization.[141] Today, museum visitors are less considered audience as they are authors, "active participants in meaning making and content creation."[142] Multimedia and ICTs have now become common methods for facilitating more interactive approaches to museum learning and engagement and, in turn, these aid in achieving educational and experiential missions in contemporary museums. Researchers in marketing, education, and museum studies claim that online interaction related to museum topics and objects promotes social presence, community-building, emotional and cognitive engagement, and entertainment.[143]

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[138] Parry, "The Practice of Digital Heritage and the Heritage of Digital Practice" in *Museums in a Digital Age*, ed.Ross Parry (Hoboken: Taylor and Francis, 2013), 1.

[139] Erminia Pedretti and Ana Maria Navas Iannini, "Towards Fourth-Generation Science Museums: Changing Goals, Changing Roles," *Canadian Journal of Science, Mathematics and Technology Education* 20, no. 4 (2020): 700-714, https://doi.org/10.1007/S42330-020-00128-0/FIGURES/5.

[140] Luise Reitstätter, Karolin Galter, and Flora Bakondi, "Looking to Read: How Visitors Use Exhibit Labels in the Art Museum," *Visitor Studies* (2022): 1-24, https://doi.org/10.1080/10645578.2021.2018251.

[141] Doukianou, Daylamani-Zad, and Paraskevopoulos, "Beyond Virtual Museums"; Pedretti and Iannini, "Towards Fourth-Generation Science Museums"; Wu et al., "Predicting Users' Acceptance of Digital Museums."

[142] Tallon, "Mobile, Digital, and Personal," xiv.

[143] Doukianou, Daylamani-Zad, and Paraskevopoulos, "Beyond Virtual Museums"; Pedretti and Iannini, "Towards Fourth-Generation Science Museums"; MacDonald, "Assessing the User Experience"; Chen, Lai, and Yu, "Participating in Online Museum Communities"; Kabassi, "Evaluating Websites"; Giuliana Guazzaroni, "Role of

However, claims of inclusive social practices, polyvocality, and engaging and entertaining stimulation through online museum resources appear to be exaggerated or misrepresented when, in fact, most people do not find online museum content to fulfill any of those goals nor do they necessarily want to. In 2021, after the COVID-19 closures and ramp up of online offerings, Culture Track, a research initiative headed by strategy and marketing firm LaPlaca Cohen, conducted a survey on "audience behaviors, attitudes, motivations, and barriers to cultural participation."[144] From over 70,000 respondents, only 9% preferred online activities over in-person and 26% were agnostic.[145] Less than 50% thought it was important to have a social component and a large majority did not participate in online museum activities.[146] From the first wave in 2020 to the second wave of the survey in 2021, respondents who participated in online activities at museums dropped from 27% to 19%.[147]

The reasons for this are unclear, but many have speculated reasons including the issues of digital materiality, the "being there" discussed in the introduction to this dissertation, as a challenge for both social interaction and object enactment.[148] Business and health professionals have also blamed digital or screen fatigue for online disinterest; people do not necessarily want to spend dedicated leisure time using the screens that have become necessary for every other part of

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Emotions in Interactive Museums: How Art and Virtual Reality Affect Emotions," *in Virtual and Augmented Reality in Education, Art, and Museums*, ed. Giuliana Guazzaroni and Anitha S. Pillai (Hershey, PA: IGI Global, 2020); James E. Katz and Daniel Halpern, "Can Virtual Museums Motivate Students? Toward a Constructivist Learning Approach," *Journal of Science Education and Technology* 24, no. 6 (2015): 776-88, https://doi.org/10.1007/S10956-015-9563-7.

[144] LaPlaca Cohen and Slover Linett, *Culture + Community in a Time of Transformation: Key Findings from Wave 2*, November 23, 2021, 3, https://culturetrack.com/research/transformation.

[145] LaPlaca Cohen and Slover Linett, *Culture + Community*, 15.

[146] LaPlaca Cohen and Slover Linett, *Culture + Community*, 16.

[147] LaPlaca Cohen and Slover Linett, *Culture + Community*, 19.

[148] Bollmer, *Materialist Media Theory*, 10; Schultze and Brooks, "Interactional View," 709; Mennecke et al., " Embodied Social Presence"; Aviv Shachak and Maria Alcocer Alkureishi, "Virtual Care: A 'Zoombie' Apocalypse?" *Journal of the American Medical Informatics Association* 27, no. 11 (2020): 1813-15, https://doi.org/10.1093/JAMIA/OCAA185.

their life.[149] While these factors are most likely contributors to online reticence, there appears to be a more encompassing issue: museum practitioners, as a whole, are not great at making appealing online content in either an education or entertainment sense.

For example, museums in recent years have boasted their interactive and personalized approaches to support meaning making and inclusivity onsite and online.[150] In his research on user experience of online museum collections, however, Craig MacDonald found that this drive toward personalization went against many of the professional tenets of user experience (UX) design.[151] While museum experts saw uniqueness of virtual experience and personalization of experiences as necessary driving forces for their online presence, UX experts remarked that these "things museums care about but aren't an actual problem that users worry about" and that they "had never seen personalization done well in a museum context."[152] Don Norman wanted to cover both notions of human-computer interface and usability when he coined the term "user-experience" and research shows that museums have not been adept at either in terms of encouraging online engagement.[153] Although museums report high numbers of website visitors, often more than 50% of visitors to museum websites spend less than 10 seconds on the site, clicking through one to two pages, the most popular being maps and ticketing information.[154]

In a similar vein, it has become apparent that museums, in their attempt to provide online resources, neglect the users' needs and goals of visiting a museum in favor of providing content.

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[149] MacDonald, "Assessing the User Experience"; Shachak and Alkureishi, "Virtual Care."

[150] Mette Skov and Peter Ingwersen, "Museum Web Search Behavior of Special Interest Visitors," *Library & Information Science Research* 36, no. 2 (2014): 91-98, https://doi.org/10.1016/J.LISR.2013.11.004.

[151] MacDonald, "Assessing the User Experience";

[152] MacDonald, "Assessing the User Experience";

[153] Don Norman in Peter Merholz, "Whither 'User Experience,'" *Interface Pieces* (blog), *Interface Design*, November 24, 1998, https://www.peterme.com/index112498.html.

[154] Fantoni, Stein, and Bowman, "Visitor Motivation and Engagement"; David Walsh et al., "Characterising Online Museum Users: A Study of the National Museums Liverpool Museum Website," *International Journal on Digital Libraries* 21, no. 1 (2020), https://doi.org/10.1007/S00799-018-0248-8/TABLES/19.

For instance, collection access interfaces that are more "generous" toward browsing and exploration-based inquiry that encourages material awareness of the objects, but online access to collections remains mostly unfeasible to anyone without a specific goal due to the reliance on keyword searching as the primary method for access returning "miserly lists."[155] There is a focus on the content, on the provision of information, but not how it will be consumed in ways that have yet to be accounted for in many online arenas. Research has shown that digital museum resources often fall short aesthetically and navigationally in visitor experience studies in addition to concerns of questionable relevancy in the content provided.[156]

In *Universal Principles of Design*, a fundamental design book, the authors state that we need to "meet people's basic needs before they can attempt to satisfy higher level needs."[157] In the online space, museologist Chiara Ciaccheri suggests that the addressing basic needs of museum visitors means that we structure experience to "include functionality (they should work), reliability (they should work well), usability (they should be easy to use), proficiency (they should enable people to do something better), creativity (they should enable people to do something new)."[158] David Bearman's words from 1995 still ring true, "We neither understand the audiences we have been serving nor the new audiences we might be reaching well enough to design good interactive computer based experiences for them."[159]

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[155] Stack, "Exploring Museum Collections Online"; Mitchell Whitelaw, "Generous Interfaces for Digital Cultural Collections," *Digital Humanities Quarterly* 9, no. 1 (2015), http://www.digitalhumanities.org/dhq/vol/9/1/000205/000205.html.

[156] MacDonald, "Assessing the User Experience"; Doukianou, Daylamani-Zad, and Paraskevopoulos, "Beyond Virtual Museums"; Quigley, "Striving to Persist"; Jessie Pallud and Detmar W. Straub, "Effective Website Design for Experience-Influenced Environments: The Case of High Culture Museums," *Information & Management* 3, no. 51 (2014): 359-73, https://doi.org/10.1016/J.IM.2014.02.010.

[157] William Lidwell, Kritina Holden, and Jill Butler, *Universal principles of design* (Beverly, MA: Rockport, 2003).

[158] Ciaccheri, "Do Virtual Tours in Museums Meet the Real Needs of the Public? Observations and Tips from a Visitor Studies Perspective," *Medium*, May 12, 2020, https://medium.com/@mchiara.ciaccheri/do-virtual-tours-in-museums-meet-the-real-needs-of-the-public-127325d652e0.

[159] Bearman, "Multimedia Computing and Museums," i.

2.3.2.3 Convenience, Collaboration, and Cost

One of the most common tensions in digital museum projects is the insistence on convenience, collaboration potential, and cost effectiveness, what I think of as the three C's of digital museum projects, as a ruse to distract from the diminished resources of museums. In fact, as alluded in the previous subsections and the consequences of which will be touched upon in the cases studied in this dissertation, digital projects are often "expensive, high-risk, over-hyped, and requir[e] an unfamiliar up-skilling of the workforce."[160] Although Ross Parry, from whose work I isolated the previous quote, argued that these issues were becoming less prominent as digital heritage matured in 2010, we have seen these realities continue.[161]

Digital projects are "championed as a way to keep costs low by eliminating the expenses for analog… such as shipping, printing, insurance, and security" and methods to support "cooperation and integration" among institutions.[162] While it is true that throwing something online is relatively easy, the cost of computing equipment is less prohibitive than it once was, and that the digital space allows for transnational connection, these benefits fail to account for the true expenses of creating and sustaining digital projects that museum visitors find relevant or worthwhile.[163] As a result, museums "tend to mismanage their online presence and communication" and "there are still details that need to be worked out."[164] And, as Aisling Quigley

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[160] Parry, "Practice of Digital Heritage," 1.

[161] Gelfand, "If We Build It"; Hylland, "Even Better than the Real Thing?"; Bernadine Bröcker Wieder and Francesa Polo, "Vastari Report Unveils Key Details of the $5.9 Billion Museum Exhibitions Market," *ArtfixDaily Artwire*, April 2, 2019, https://www.artfixdaily.com/artwire/release/1282-vastari-report-unveils-key-details-of-the-59-billion-museum-exhib

[162] Gelfand, "If We Build It," 70; Matthew F. Nickerson, "Online Multimedia Museum Exhibits: A Case Study in Technology and Collaboration," *Library Hi Tech* 22, no. 3 (2004): 270, https://doi.org/10.1108/07378830410560062.

[163] Wu et al., "Critical Factors for Predicting Users' Acceptance of Digital Museums for Experience-Influenced Environments."

[164] Eduard Cristobal-Fransi et al., "Museums in the Digital Age," *Journal on Computing and Cultural Heritage* 14, no. 4 (2021): 56:1, https://doi.org/10.1145/3464977; Wu et al., " Predicting Users' Acceptance of Digital Museums."

outlines in her doctoral dissertation, digital exhibition projects often fail to align with purported goals of engagement and sustainability.[165] Additionally, according to the same 2021 *Culture Track* survey, over two-thirds of respondents believed that it was important for digital activities to be free.[166] This creates even more of a strain on the already limited resources.

Evidence of these pervasive challenges to produce effective digital projects, whatever "effective" may mean, can be seen in the composition of the teams and funding behind what is considered a "successful" project. These projects are those that 1) are headed by institutions with large operating budgets like the Smithsonian or the Louvre, 2) are heavily subsidized by government or educational grant support seen in the proliferation of university initiatives to produce virtual reality and other more experimental projects, 3) have partnered with ICT companies like Google Arts and Culture, 4) have been created through collaborative digital resource aggregators like the Digital Public Library of America or Project Gutenberg, or 5) are simply the digital content management system with a public interface, not a dedicated public-oriented project.[167]

In one instance of this expense, the professional know-how to get all of this accomplished imposes strains on the institutions and professionals who, as Jennifer Trant discusses, are not adequately trained for practices of digital heritage and curation.[168] Respondents to a 2017 Mu.SA

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[165] Quigley, "Striving to Persist."

[166] Cohen, "A Time of Transformation."

[167] Gelfand, "If We Build It," 70; Hylland, "Even Better than the Real Thing?"; Bröcker Wieder and Polo, "Vastari Report Unveils Key Details;" Margee Hume and Michael Mills, "Building the Sustainable iMuseum: Is the Virtual Museum Leaving Our Museums Virtually Empty?" *International Journal of Nonprofit and Voluntary Sector Marketing* 16, no. 3 (2011): 275-289, https://doi.org/10.1002/nvsm.425; "The Ultimate Guide to Virtual Museum Resources, E-Learning, and Online Collections," Museum Computer Network, accessed April 9, 2022. https://mcn.edu/a-guide-to-virtual-museum-resources.

[168] Trant, "Emerging Convergence? Thoughts on Museums, Archives, Libraries, and Professional Training," *Museum Management and Curatorship* 24, no. 4 (2009): 369-87, https://doi.org/10.1080/09647770903314738.

research survey stated that "the most important role-profiles in which museums should invest by up-skilling their staff" are digital strategy manager, digital collections curator, digital interactive experience developer, and online community manager.[169] This suggests that not only are museums not understanding the financial and technological feasibility of providing sustainable digital resources, but they also need more training to conduct the traditional professional roles in light of the digital. As the authors of the report note, "staff highly skilled in digital skills are crucial in order to help museums use new technologies to multiply opportunities for exchange, accessibility and participation for audiences," and museum professionals are not being trained or hired to do this type of work.[170] Overall, the research shows that digital projects are resource-intensive and, apart from the practical affordances of digital collections, most museums have little incentive to produce deeper digital engagements.

2.4 Affordances of Remediation

In this dissertation, I take the position that a sociomaterial awareness of museum objects, their entrenchment in historical and professional practices, and the mediation strategies used to enact those objects will aid in resolving the tensions outlined in the previous sections. As such, this dissertation is situated among all of these tensions both within and without the black box of computational technologies. But, in this study, I am particularly interested in the physical and digital interfaces created for public interaction, which are also interfaces "within museum practices

[169] Antonia Silvaggi and Frederica Pesce, *Emerging Job Profiles for the Museum Professionals.* Museum Sector Alliance, May 5, 2017, 8-9, http://www.project-musa.eu/wp-content/uploads/2020/06/MuSA-Emerging-Job-Profiles-for-museum-professionals.pdf.

[170] Silvaggi and Pesce, "Job Profiles for Museums in the Digital Era," 57.

and technologies of exhibition."[171] This study operates at the same level of interaction with computational technologies as the educators, curators, and archivists who mostly relied on their experience with user interfaces, with the boundaries of what they can see and control from a user, not a programmer, role.

Noted in the guiding realizations of an Information Ecosystems Cookbook module on the relationship between data representation and interfaces, "Interfaces assert a world that isn't necessarily the totality of your options…The user interface determines to a large extent how usable and useful that system is for a given task for a user, but just because the interface you are working with doesn't give you the option to do what you want, doesn't mean it isn't possible."[172] Matt Kirschenbuam reminds us that what the objects look like when they are presented online is a performance.[173] As digital culture theorist Grant Bollmer, discussing Marianne van den Boomen's work, states, "the interface, in many ways, deceives you through images that are metaphors for material processes that remain unobserved."[174] This dissertation observes the performance, or enactments, of online and onsite objects.

Nicole Meehan, an art historian who studies the idea of networked memory, recently argued that digital museum objects have their own value and agency and, as such, they should not be conceptualized "in relation to [their] physical counterparts."[175] In studies of how cultural heritage professionals conceptualized digital objects, she and Jasmine Burns have both found that those working with the objects considered digital objects lower in value because they kept

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[171] Haidy Geismar, *Museum Object Lessons in the Digital Age* (London: UCL Press, 2018), xv.

[172] Langmead and Jane Thaler. "Data Representations: Investigating the Relationship between Geospatial Data Standards and Interface Capacity," Information Ecosystems Cookbook, accessed April 9, 2022, https://infoeco.hcommons.org/infoecocookbook/representing-data-geospatial-data-and-interfaces.

[173] Kirschenbaum, *Mechanisms*.

[174] Bollmer, *Materialist Media Theory*, 2; Marianne van den Boomen, "Interfacing by Iconic Metaphors," *Configurations* 16, no. 1 (2008): 35-55, https://doi.org/10.1353/CON.0.0045.

[175] Meehan, "Digital Museum Objects and Memory," 1.

comparing them to their non-digital form.[176] I agree that value between the two is not the important, or helpful, consideration and that objects should be thought of as different originals. However, recalling N. Katherine Hayles' claim that the meaning of a work cannot be separated from its physical manifestation, the meaning of a remediated digital object is still connected to the non-digital.[177]

Tempering Meehan's assertions here with Johanna Drucker's that digital objects are not interchangeable with their non-digital "originals," I suggest, instead, that we first figure out how they are different; not better or worse, just different.[178] In effect, supporting a FRBR-like (Functional Requirements for Bibliographic Records) relationship between the various aspects of these objects as expressions of the same work that manifests as different items.[179] In practice, this recalls Bruno Latour and Adam Rowe's argument that research using high-quality copies of an original might actually produce more fruitful results than looking at the original itself.[180] Owens and Padilla echo this vein reiterating that "aspects of the source only become available for analysis through the production of a very high surrogate."[181] Contributing to the research on the materiality of museum objects, I ask what is added, what is transferred, and what is lost through the affordances of remediation.

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[176] Meehan, "Digital Museum Objects and Memory"; Burns, "The Aura of Materiality: Digital Surrogacy and the Preservation of Photographic Archives," *Art Documentation* 36, no. 1 (2017): 1-8, https://doi.org/10.1086/691368.

[177] Hayles, "Translating Media," 276.

[178] Drucker, "Performative Materiality."

[179] IFLA Study Group on the Functional Requirements for Bibliographic Records, *Functional Requirements for Bibliographic Records: Final Report*, IFLA Series on Bibliographic Control, vol. 19 (International Federation of Library Associations and Institutions, 2009), https://repository.ifla.org/handle/123456789/811.

[180] Bruno Latour and Adam Lowe, "The Migration of the Aura or How to Explore the Original through Its Fac Similes," in *Switching Codes: Thinking Through Digital Technology in the Humanities and the Arts*, ed. Thomas Bartscherer and Roderick Coover (Chicago: Chicago University Press, 2010), 275-297.

[181] Owens and Padilla, "Digital Sources and Digital Archives."

3.0 Methodology

My research questions in this dissertation are ultimately concerned with how sociomaterial affordances of onsite museum object enactments developed and how those affordances either shifted, were activated, or were lost when digitally remediated. Such questions require tracing the onsite and online instances of enactment through the relational social, cultural, and material conditions that brought the enactments to fruition. This means that I needed to study both their present and their past at various degrees of complexity depending on the consequentiality of each layer found to be present in the enactment.

To answer these questions, I employed an approach known as Biographies of Artifacts and Practices (BOAP) to examine and analyze the sociomaterial affordances of three digitally remediated object enactments: Live Animal Encounters at the Carnegie Museum of Natural History (CMNH), the Online Exhibition Series at the Carnegie Museum of Art (CMOA), and *Time Capsule 21* at The Andy Warhol Museum (AWM). Guided by this approach I selected object biography as an investigative method at the case level and comparative case analysis for the overall discussion to support the historiographic, ethnographic, and comparative goals of BOAP. Using three main data sources, which were observations, interviews, and documentation, I was able to move between the micro, meso, and macro within these methods, as prescribed by the BOAP approach, to examine the complex relationships between objects, practices, and mediation techniques in each case.

3.1 Biographies of Artifacts and Practices

In line with research designs utilized in science, technology, and society studies (STS) and organizational studies focused on sociomateriality, the BOAP approach utilizes a variety of data gathering and analysis methods to accommodate the multi-sited, multi-temporal, and generative nature of the research process involved in understanding how specific configurations of technologies, practices, and artifacts "bring forth specific versions of reality."[182] BOAP studies weave together historiographic and comparative ethnographic methods for data collection and analysis in order to trace the development of technologies as they flow through local sites of production.

The approach is especially concerned with "investigating the different materialities and their effects in different sites and times of technology's life" and is characterized by a "recursive movement between different data-sets and different sampling strategies to examine data at different grain sizes."[183] Such intentional movement across temporalities and scale supported my selection of methods and data sources. In this dissertation, I use the BOAP approach to frame a research program that both "drill[s] down into the detail of the settings" while also "pay[ing] attention to long time spans of technological development" by combining techniques from object biography and collective case study analysis to investigate and compare multiple sites of object enactments unfolding in time and the transfer of affordances in online settings.[184]

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[182] Kerasidou, "Feminist STS and Ubiquitous Computing," 101.

[183] Hyysalo, Pollock, and Williams, "Method Matters in the Social Study of Technology," 10.

[184] Hyysalo, Pollock, and Williams, "Method Matters in the Social Study of Technology," 15; Van Tiem et al., The STS Case Study: An Analysis Method for Longitudinal Qualitative Research for Implementation Science," *BMC Medical Research Methodology* 21, no. 1 (2021): 1-12, https://doi.org/10.1186/S12874-021-01215-Y/TABLES/1. My design is similar to the "STS case study" method recently proposed by Jennifer Van Tiem et al. (2021) that looked at how technological intervention in telemedicine altered clinicians' treatment strategies.

Detailed by Sampsa Hyysalo, Neil Pollack, and Robin Williams, BOAP emerged as an empirical research framework in science and technology studies (STS) in the 1990s for studying the sociomaterial contexts of technological change through both multi-sited ethnographic and longitudinal investigations.[185] In their review of this research, they found that BOAP studies generally (1) have sufficient spatial and temporal reach to empirically engage the dynamics of the studied phenomenon, (2) view the shaping of technology and practices as taking place within ecologies of interconnected actors, (3) identify interstices where focal actors affect each other, (4) pursue research at multiple temporal and spatial scales, (5) see events as simultaneously constituting and being constituted by broader patterns, (6) insist on investigating materiality, (7) attempt balanced accounts of actors, and that they (8) attend to the detailed dynamics of sociotechnical change.[186] These features impacted the themes and direction of this study as a whole while also providing guidance toward appropriate methods for more specific data collection and analysis.

One such method I selected to structure the case investigations that respond to my first research question in this study is known as object biography. Covering the historiographic and ethnographic areas of BOAP concern, object biography is a research method for considering the shifting contextual relationships of things and people and was first proposed by anthropologist Igor Kopytoff in 1986 as a technique for studying the lives of things similarly to how we would study the lives of people.[187] To understand how "objects and people inform and transform each

[185] Hyysalo, Pollock, and Williams, "Method Matters in the Social Study of Technology," 4.
[186] Hyysalo, Pollock, and Williams, "Method Matters in the Social Study of Technology," 6-8.
[187] Kopytoff, Igor. "The Cultural Biography of Things: Commoditization as Process," in *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai (New York: Cambridge University Press, 1986): 64-91.

other," the method asks researchers to trace the trajectories of objects through their life stories.[188] It takes the position that "things are culturally constructed as people are culturally constructed" and that objects are not merely at the mercy of human use and intervention, but have dynamic lives and are integral to human action.[189] The written product of object biography can sometimes appear similar to media archaeological studies, especially when the object is born-digital in that they both map the histories of mediated objects; this comparison will be especially salient in CMOA chapter. However, the object biography method is less interested in so-called "dead media" and its dominant narratives of innovation and usurpation, and more interested in the history of the object as it moves through various relations with practices and technologies.[190]

While its anthropocentrism has been criticized and modifications have had to be made to accommodate things like prehistoric objects, the relationality of object biographies has shown to be effective in illuminating various aspects of objects' life stories: like their ability to exist with multiple assignments of significance and functional possibilities; how they can take on personalities; and their transformational qualities given time, movement, and change among other findings.[191] Object biography has been found effective by museum studies scholars and historians of science who "seek to answer how human relations were realized…by producing, exchanging,

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[188] Kathy Carbone, " A Collection and Its Many Relations and Contexts: Constructing an Object Biography of the Police Historical/Archival Investigative Files," *Journal of Documentation* 76, no. 3 (2020): 755, https://doi.org/10.1108/JD-06-2019-0111.

[189] Kopytoff, "The Cultural Biography of Things," 68; Chris Gosden and Yvonne Marshall, "The Cultural Biography of Objects," *World Archaeology* 31, no. 2 (1999), 169-78, https://doi.org/10.1080/00438243.1999.9980439; Jody Joy, "Reinvigorating Object Biography: Reproducing the Drama of Object Lives," *World Archaeology* 41, no. 4 (2009): 540-556, https://doi.org/10.1080/00438240903345530.

[190] Jussi Parikka, *What Is Media Archaeology?* (Malden: USA Polity Press, 2018).

[191] Ann-Sophie Lehmann, "Object Biography: The Life of a Concept," produced by the Bard Graduate Center Research Forum, filmed November 2, 2021, YouTube Video, 1:30:49, https://www.youtube.com/watch?v=vVz06Xaf-wI&ab_channel=bardgradcenter; Joy, "Reinvigorating Object Biography"; Madeline Fowler, Amy Roberts, and Lester Irabinna Rigney, "The 'Very Stillness of Things': Object Biographies of Sailcloth and Fishing Net from the Point Pearce Aboriginal Mission (Burgiyana) Colonial Archive, South Australia," *World Archaeology* 48, no. 2 (2016): 210-225, https://doi.org/10.1080/00438243.2016.1195770.

and using objects."[192] So, too, the method has been proposed as a collection-level description practice for dealing with the "curation crisis" in museum collections, a proposition that informs the practicality of my suggested online object enactment conceptualization strategy in the final chapter of this dissertation.[193]

In response to my second research question regarding object enactment practices across institutions, I treat each object biography as an instrumental case that contributes to an overall comparative case study using cross-case analysis in the final chapter of this study to describe the similarity and differences and present a more holistic account of remediated object enactments in the discussion chapter. In a collective case study, the researcher first treats each case on its own, as I do in the object biographies, then conclusions from each case can be brought together and analyzed.[194] Using a comparative approach, I am able to compare the relational entanglements and affordances from each case to see how the museums intersected or diverged in their practices of creating online remediated object enactments and, in doing so, outline implications of digital remediation choices and develop methods for mapping the relational affordances to remediation strategies.

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[192] Chris Gosden and Chantal Knowles, *Collecting Colonialism: Material Culture and Colonial Change* (New York: Routledge, 2020), xxi.

[193] Zanna Friberg and Isto Huvila, "Using Object Biographies to Understand the Curation Crisis: Lessons Learned from the Museum Life of an Archaeological Collection," *Museum Management and* Curatorship 34, no. 4 (2019): 362-382, https://doi.org/10.1080/09647775.2019.1612270.

[194] Alison Jane Pickard, *Research Methods in Information.* 2nd ed. (London: Facet Publishing, 2013101; Robert E. Stake, *The Art of Case Study Research* (Thousand Oaks, CA: Sage Publications, 1995), 236.

3.2 Site Selection

I selected institutions and object enactments carried out therein through non-probability, purposive sampling to conduct this multi-sited, comparative study about online remediation of object enactments in cultural heritage settings. To do so, I relied on my familiarity with the institutions and the topic to choose cases that would be accessible to me during a worldwide pandemic, had online enactments advertised during the pandemic closures, and those that met the considerations of the BOAP approach. This meant that there must be an onsite and an online version of each object enactment within an institution and that I would need to have access to multiple levels of temporal and spatial data during the unpredictability of the pandemic. As such, three of the Carnegie Museums of Pittsburgh (CMP) located in Pittsburgh, Pennsylvania serve as the institutional bases for this study of object enactments. The CMP closed their doors on March 14, 2020, due to the Covid-19 pandemic and, until their reopening on June 29th, their public programming and educational content was provided through online platforms with social distancing, occupancy restrictions, and the public's hesitancy about visiting enclosed spaces or traveling contributing to ongoing online creation following museum openings.[195]

During this time, the Carnegie Museum of Natural History remediated their Live Animal Encounter through video conferencing software, the Carnegie Museum of Art embedded a video art series on their website, and the Andy Warhol Museum highlighted their online exhibition of a serial artwork. The fourth CMP museum, the Carnegie Science Center, was excluded from this

[195] Betsy Momich, "The Four Carnegie Museums Closing Due to Covid-19 Emergency," Carnegie Science Center press release, March 13, 2020, https://mailchi.mp/carnegiemuseums.org/covid-19-closure-announcement?e=%5bUNIQID%5d; Betsy Momich, "Carnegie Museums of Pittsburgh Announces Plans to Re-Open Its Museums Safely," Carnegie Science Center press release, June 9, 2020, https://mailchi.mp/carnegiesciencecenter.org/re-opening?e=%5bUNIQID%5d.

research during the purposive phase of sampling because it did not participate in enacting unique objects and the concepts they convey or elucidate online. Science museums like the Carnegie Science Center tend to create and disseminate ideas or concepts without a specific reference object. Because of this trend, their online content was geared toward activities about scientific concepts, not any particular collection objects.

Additional factors that shaped case selection were the institutions' similarities that provided control parameters which included the museums' operation under the Carnegie Institute umbrella, their location within the same ecoregion and cultural zone, and their unremarkable digital offerings prior to the pandemic. While these similarities offered a baseline, the heterogeneity of the objects and the institutional types offered an investigation of different enactments to inform an understanding of the range of sociomaterial implications in line with BOAP considerations.[196]

3.3 Data Sources

BOAP relies on inductive and qualitative methods that enable recursive analytic methods to move between scales of relations and instantiations. As such, it encourages collecting data from a variety of sources to move between the micro, meso, and macro levels of relations between objects, practices, and technologies. For this detailed examination of the relationships involved in remediated object enactments, from their life stories to their existence during the Covid-19

[196] Alternative approaches that would also adhere to the BOAP approach could be to study different object enactments in the same museum or similar types of objects across various institutions.

closures, I used observation notes, semi-structured interviews, and textual and visual documentation as the main sources for investigation.

3.3.1 Observation Notes

Alison Pickard notes that "observations are carried out in order to provide the 'here and now.'"[197] To understand and situate the objects as they were enacted, meaning as they are performed or in some way presented to the public, I used non-participant observation as a data collection technique. Within each of my selected institutional sites, there were two locations of non-participant observation: the onsite enactment and the online enactment. In both, my observation included a moving inspection of the museum starting at the boundary of institutional control, then working my way through the space to the enactment and a stationary observation of the enactment itself. For the onsite walk through the museum, this meant starting with the actual doors and ending in the theater or gallery specific to the object in question. The online version of this process began with the base domain (identified as the string used by the Domain Name System to define the website's location) and followed the full path of the enactments' URL, exploring related pages at each level of the path. To attempt consistency between institutions, I created what is known as an observation briefing sheet with prompts to focus my observations toward descriptions of the settings, objects, and apparent practices in alignment with object biography (see Appendix A).

[197] Pickard, *Research Methods in Information*, 225.

Observing the enactments themselves was slightly different at each institution in accordance with how the enactments took place. For the Live Animal Encounters at CMNH, I watched four programs (two onsite and two online) through their duration which ranged from thirty to forty-five minutes. In both the video enactments at CMOA and Time Capsule 21 at AWM, I arranged for two unescorted observation sessions in the exhibition galleries of forty-five minutes each and spent two dedicated sessions of equal time exploring the online enactments. The interconnected nature of the online enactments at these institutions functioned as leads to other data sources, so additional unstructured engagement occurred throughout data collection with these sources.

Exploring the online enactments was necessarily conducted through the use of a computer and a web browser. Because "any given browser will render things slightly different" and every computer setup is different, the import of these devices on the results of the study may be significant to note.[198] I attempted to generalize my online observations through the use of multiple monitors and through reference to commonalities across platforms. The majority of online observational data was collected on an Apple MacBook Air (13" M1 2020 model, running the macOS 11 Big Sur operating system) using the Google Chrome freeware web browser (versions 80.0.3987 through 100.0.4896, updating in accordance with Google's recommendations). Additional data was collected on an Apple iPhone (model 11, running iOS mobile operating system, versions 14 through 15, updating in accordance with Apple's recommendations) also using Google Chrome (for iOS).

[198] Owens and Padilla, "Digital Sources and Digital Archives."

3.3.2 Semi-Structured Interviews

Interviews allow for more immediate answers, especially for questions of "why", the resolution of ambiguities, and unexpected insights.[199] This technique is important to this research design because many aspects of the behind-the-scenes practices involved in the creation of the enactments were not accessible to a researcher during the pandemic due to closures and social distancing regulations, thus not directly observable through a different method like participant observation. I conducted semi-structured interviews with a staff member from each institution who was directly involved with the objects or enactments in question. Each interview was conducted via Zoom and lasted between forty-five minutes to an hour, guided by a questionnaire that established the participants' experience working with the objects in both onsite and online settings (see Appendix B). I recorded the interviews using Zoom's local recording tool that captured both the video and audio streams, then I conducted non-verbatim transcription on the audio. These transcriptions were approved by the interviewees before the publication of this study and constituted the basis of the interview data.

Finding participants who had the time and energy to participate, and, in the case of CMOA, the institutional approval, to discuss this work, during the first year of the pandemic, proved to be challenging. Staff at cultural heritage institutions disclosed in a 2021 survey conducted by the American Alliance of Museums that the pandemic had "taken a significant toll on their mental health and well-being" in addition to reported burnout prior to the pandemic.[200] This reality

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[199] G. E. Gorman and Peter Clayton, *Qualitative Research for the Information Professional: A Practical Handbook* (London: Facet Publishing, 2005), 125.

[200] Elizabeth Merritt, "Combatting Burnout in the Museum Sector." Center for the Future of Museums (blog), American Alliance of Museums, May 5, 2021, https://www.aam-us.org/2021/05/05/combating-burnout-in-the-museum-sector; Wilkening Consulting and American Alliance of Museums, Measuring the Impact of Covid-19

resulted in several staff members at CMNH and CMOA who expressed interest in this research kindly declining my requests for an interview. In these cases, the team members I contacted for interviews elected to have one representative speak with me on behalf of the team to reduce the burden while still wanting to contribute to the project. In both of those cases, the team member selected had direct experience working with the objects onsite and enacting the objects online through a curatorial or educational perspective as opposed to a technical or computing perspective. They also provided feedback from other team members that had been passed along for the purpose of this research. Additionally, I was fortunate to have information informally corroborated or added by other staff members throughout the period of data collection, much of which qualified as observational data in this design or pointed me toward relevant documentary resources.

The following individuals participated as representatives of the enactment team in semi-structured interviews:

- Carnegie Museum of Natural History: Gallery Experiences Coordinator
- Carnegie Museum of Art: Curatorial Assistant for Modern & Contemporary Art and Photography
- The Andy Warhol Museum: Manager of Archives

The Institutional Review Board (IRB) at the University of Pittsburgh determined that this study does not meet the definition of Human Subject Research and, as such, was exempt from IRB submission. Because the research was conducted in the Commonwealth of Pennsylvania, which is a two-party consent state, I received written and verbal consent to record the interviews for

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on People in the Museum Field (2021), https://www.aam-us.org/wp-content/uploads/2021/04/Measuring-the-Impact-of-COVID-19-on-People-in-the-Museum-Field-Report.pdf.

transcription purposes with the understanding that the recordings would be permanently deleted upon publication of the study.

3.3.3 Primary and Secondary Documentation

I employ the collection of already existing documentary sources in this research not simply as background information, as Andrew Shenton cautions, but as a principal data collection technique that contributes to biographical development and data triangulation.[201] Amelia Acker argues, in agreement with Peter Botticelli, Kalpana Skanker, and Susan Leigh Star, that studying where people communicate through documents is the messy in between, or the meso level, that allows for a full range of analysis.[202] These documentary sources were both textual and visual, and there were several ways in which I accessed them. The first was through archival research, wherein I sought documentation related to the particular objects being enacted as well as how practices related to the object throughout institutional histories. Another was through internal materials like meeting notes and planning documentation offered by the institutional team members. I also used institutionally published content like websites and social media content, blogs, press releases, and exhibition catalogs. In several cases, there were also peer-reviewed publications that directly discussed the objects under investigation. Some of these were particularly useful because they were written by previous staff who worked with the objects, so they complemented, if not mirrored, both observation and interview data.

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[201] Pickard, *Research Methods in Information*, 251.

[202] Acker, "Born Networked Records: A History of the Short Message Service Format," PhD diss., University of California, 2014: 11.

3.3.4 Employment Disclosure

During the development of this dissertation, I became an employee at the CMNH in their Lifelong Learning department. A team in this department manages the Living Collection and Live Animal Encounter programming, the latter of which had already been selected as a case study for this research. In my role, I was not a member of the animal care team, nor was I directly involved with the planning or execution of the Live Animal Encounters. My data collection and analysis methods were not altered for this case. I approached my interviews, observations, and documentation collection in a manner consistent with the other two cases at CMOA and the Warhol. This meant submitting formal requests for interviews and consistently performing interviews protocol; undertaking unpaid, scheduled observation periods during public events, open hours, or via publicly available websites; and accessing documentation that can be made available to any researcher. No funding or additional support was provided by the institution for this research.

4.0 Live Animal Encounters at the Carnegie Museum of Natural History

> The museum "to which people go to meet animals, to observe them, to see them, is, in fact, a monument to the impossibility of such encounters."
>
> John Berger, *About Looking*

4.1 Introductory Vignettes

4.1.1 Live Animal Encounters in Earth Theater

You decided to purchase the Live Animal Encounter add-on when you came to the museum today after seeing some posts on the Carnegie Museum of Natural History's (CMNH) social media earlier in the week. Not entirely sure what the add-on entails, you figure that the extra three dollars is worth the chance to see the skunk from their Instagram post in person. The staff member at the ticket counter tells you that the show is in a place called Earth Theater at the farthest end of the museum and directs you to a suggested route that will take you from the Carboniferous Period to our current Anthropocene Epoch. You fall in line amidst throngs of families with small children headed the same direction.

You come upon the most popular exhibition, the one that people travel from across the world to see called *Dinosaurs in their Time,* which features fossilized bones mounted into

imagined action scenes accompanied by wall murals depicting how the animals might have looked with the now decomposed soft tissue still intact along with informational text panels and touch screens adding information about these creatures, their habitats, and how they ended up in Pittsburgh. Some of the more recent animal bones in the subsequent Mesozoic and Cenozoic exhibition space have received an on-the-bone treatment of being displayed as half bone, half reconstructed plastic flesh. The specimens on display grow increasingly more life-like as you continue into Discovery Basecamp, where you find the entrance to Earth Theater behind rows of taxidermy mammals and birds encased in moveable, see-through boxes. You're early for the show, so you follow the signage in the area that beckons you to "slow down, look closely, touch everything" while you wait to be admitted. Unlike the areas you just came from, there is little other textual framing made available in this gallery. You are encouraged to touch and manipulate the specimens on display, many of which appear to be still extant species. You feel the teeth of a lion, the fur of a bear, and are in the middle of moving all the encased owls together to examine their differences and similarities when a staff member announces from the theater doors that seating for the Live Animal Encounter is now open to the waiting crowd.

You enter the darkened theater to take a seat in the rows of stadium style seats. The same staff member from before closes the doors and walks to the front of the room positioning themselves behind a covered table. Donning a headset mic, they introduce themselves as an animal handler who is here to share information about animals from the museum's Living Collection which you get to meet during the show. This information includes their natural habitat, their life in nature, the imposition of humans on that life, and their relationship to the non-living scientific collections at the museum. Before bringing out the animals, which are staged underneath the table, the handler also lays out what is expected from you as an audience member to accommodate a safe

close-up experience with the animals including staying seated during the show, refraining from any attempts to touch the animals, and using visual cues to express discomfort with an animal coming close instead of verbalizing any protests.

The ground rules have been set, you watch as the handler successively presents four animals, in this case a bird, a snake, a skink, and a skunk, walking each animal one-by-one around the periphery of the seats to give folks a more intimate view of each creature while telling stories and facts. Throughout, the audience is encouraged to ask questions and react to semi-scripted cues from the handlers to become more acquainted with the species and the creature being shown. Audience members seem to build momentum, or courage, from one another as more speak up with questions during the show. Many of the handler's responses seem geared toward understanding how these animals function in nature and justifying their current existence in the museum, the combination of which seems to be encouraging an empathic response from the audience. After about thirty minutes of the presentation and a final Q&A session, the audience then leaves the theater and you all become self-guided visitors among dead animal specimens once again.

4.1.2 Online Live Animal Encounters

The #MuseumFromHome trend keeps popping up on your social feeds, which makes you wonder what virtual events your local Pittsburgh museums have begun during the Covid-19 pandemic. Navigating to the "Carnegie Museums From Home" webpage, you see a mix of activities, resources, and programs from each of the Carnegie Museums of Pittsburgh gathered into lists. You notice one about meeting living animal ambassadors that seems interesting, so you book a ticket to the show this upcoming Wednesday. On the morning of the encounter, you receive an email from the Gallery Experience Coordinator with a brief logistical greeting that reminds you of

the time of the program and provides you with the now all-too-common sighting in your inbox, a Zoom meeting invitation.

Just before 1:30pm, you set your laptop up to become a screen for viewing the performance as you settle in to "join the meeting." After a few minutes in the virtual waiting room, your Zoom window reconfigures into a grid of mostly black tiles with white text identifying the parties on the other end. Several audience members, or "participants" in Zoom terms, have their cameras turned on giving you a peek into the interiors of their homes. A voice comes through your speakers welcoming you to the program and introducing themselves as the oral presenter for the show. They remind you to make sure your layout is in "Speaker View" and to pin the tile with cartoon landscape to your Zoom window to allow you to constantly view the video feed of the animals while the voice from a different pane narrates the show. The narrator then asks all participants to mute their microphones until the question session at the end but mentions that participants can use the chat feature if they have any animal or technical questions in the meantime.

The animal handler then comes into view with the first animal. These two are farther away from the camera than you expected and this distance, in concert with the less-than-HD camera quality, leaves something to be desired when compared to the high-quality animal documentaries now available for streaming at home. The handler holds the animal in the center of the screen, closer to the background than to the camera, while the narrator provides information about that animal, the species, and how it became part of the Living Collection. This pattern repeats with the next three animals with minor interludes while the handler switches out animals. With some of the animals, you notice that they seem to be making noises that you cannot hear. Because the narrator and handler are operating from separate physical spaces, as well as virtual, you assume that the sound of the animals has been restricted to allow for a steadier audio feed from the narrator.

At the end of the program, the handler stays on screen when the narrator asks for questions from the audience. There is a pause before participants, mostly children, chime in to ask a few questions while the majority of unceasingly blank video tiles remain undisturbed. The program ends with an expression of thanks from the presenters and the audience as the tiles slowly disconnect from the room. The program was less exciting than seeing these animals up close and in-person, but you did get a sense of who they are and why you should care. You make a mental note to see the show in person when the museum becomes safe again.

4.2 Introduction

An integral segment of the natural world, animals have long been focal points in the story of nature told by natural history museums.[203] Both "like and unlike man," telling their stories is pivotal in understanding the history and science of the world and our place in it.[204] As part of their programming devoted to telling stories about nature and our relationship with it through animals, CMNH began collecting living mammals, birds, reptiles, and invertebrates for their Living Collection in 2017 to be used in educational programming.[205] The Living Collection was an obvious choice for online content during the Covid-19 closures in 2020 with live animals who need to be fed, socialized, cleaned, and provided enrichment activities by an animal care team who was experienced in educational programming for the museum's onsite offerings, this

[203] In alignment with historical precedent and for the sake of practicality, I use the term 'animal' to mean non-human animals, though the distinction is inaccurate in both an evolutionary and taxonomic sense.

[204] John Berger, *About Looking*, First Vintage International Edition ed. (New York: Vintage International, 1991), 6.

[205] Christine O'Toole, "Animal Attraction," *Carnegie Magazine*, Fall 2017, https://carnegiemuseums.org/carnegie-magazine/fall-2017/animal-attraction.

content included the transition from their regularly scheduled Live Animal Encounters (LAE) to online platforms for the "Carnegie Museums From Home" initiative. Starring the living animals from the Lifelong Learning department's Living Collection, LAE was a recurring onsite animal show prior to the pandemic that used live animals as representatives of their species, the natural world, and human relationships with those animals during informative presentations to promote conservation and educate the public about the lived realities of animal life.[206] When the pandemic hit, an online version of the popular program called Virtual LAE was produced to mixed reviews.

Throughout this chapter, I examine "representational practices that, broadly conceived, work to fill the gap between humans and animals–to help 'bring us closer,' not necessarily to the animal itself but to the animal as imagined" within the natural history museum and affordances of these practices when moved online at CMNH.[207] I begin by outlining how and why dead and living animals became objects of formalized museum practice, detailing their positions with conceptual and exhibition frameworks used by museums to construct a representation of nature. I then describe the sociomaterial affordances of onsite LAE and how those aspects were impacted when moved online during the 2020 pandemic restrictions demonstrating how the performance depends upon the frameworks of contextual denaturing and relational liveness in the onsite enactment. The shifts in affordance between mediation strategies demonstrate that LAE were designed to exist in the conceptual constructions of nature and exhibitionary instrumentation at CMNH, and these layers of meaning were not carried over into their online remediation. At the same time,

[206] Bodlenos, "Home to Rescued Animals."

[207] Adam Dodd, Karen A. Rader, and Liv Emma Thorsen, "Introduction: Making Animals Visible," in *Animals on Display: The Creaturely in Museums, Zoos, and Natural History*, ed. Liv Emma Thorsen, Karen A. Rader, and Adam Dodd (University Park: The Pennsylvania State University Press, 2013), 3.

affordances through different styles of communication and access emerged due to the constraints of performing a live show over the internet. The Virtual LAE did allow for at-home viewing of the animal program, but significant aspects of the context and experience were left unaccounted for during the transfer.

4.3 Living Animals at CMNH

Alluding, though perhaps unintentionally, to the work of Donna Haraway, Britta Brenna, Diana Marsh, and Samuel Alberti, among numerous others who study the social construction of museum objects and the "fallacy of authoritative neutrality" in museums, Eric Dorfman, the former Director of the Carnegie Museum of Natural History, described the future of work in natural history museums as, "unravel[ling] the mysteries of the world and weav[ing] them into engaging stories."[208] In telling these stories about nature, as director of collections at National Museums Scotland, Samuel Alberti, argued, natural history museums do not explain the natural world but, instead, construct versions of nature through "the practices of collecting, preserving, and

[208] Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," *Feminist Studies* 14, no. 3 (1988): 575-599, https://doi.org/10.2307/3178066; Haraway, "Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, New York City, 1908-1936." *Social Text*, no. 11 (1984): 20-64, https://doi.org/10.2307/466593; Brenna, "Nature and Texts in Glass Cases: The Vitrine as a Tool for Textualizing Nature," *Nordic Journal of Science and Technology Studies* 2, no. 1 (2016): 46-51, https://doi.org/10.5324/NJSTS.V2I1.2136; Marsh, *Extinct Monsters in Deep Time: Conflict, Compromise, and the Making of the Smithsonian's Fossil Halls* (New York: Berghahn Books, 2019); Alberti, "Constructing Nature Behind Glass," *Museum and Society* 6, no. 2 (2008): 73-97, https://journals.le.ac.uk/ojs1/index.php/mas/article/view/116; Dorfman, "Introduction," In *The Future of Natural History Museums*, ed. Eric Dorfman (New York: Routledge, 2018), 22, https://www.routledge.com/The-Future-of-Natural-History-Museums/Dorfman/p/book/9781138692633.

displaying certain things–animals, plants, fossils and rocks–and the conceptual and exhibitionary frameworks in which they are set."[209]

The museum natures that are produced are "a very specific kind of nature, manufactured through process of care, curiosity, disciplined work, and pedagogic ambitions," that, both behind the scenes and in what is put on display, effectively operate as mechanisms to promulgate particular angles of the natural world and our place in it.[210] They do not reveal nature, but instead offer ways of compartmentalizing, categorizing, and relating to the natural world from specific human understandings. The missions and goals of contemporary museums often recognize that this work is constantly in flux and that the information communicated to the public is shaped by evolving narratives and motivations.[211]

Living collections in natural history museums operate within these constructions of nature and their meanings, like all objects in natural history museums, is muddied with the tensions between life and death, art and science, education and entertainment, and preservation and exhibition found in the "changing functions of natural history museums and the radical shifts in the meaning of animals."[212] Enactments of living collections in these institutions are built upon these historical foundations and exist in response to the displayed development of the human-animal relationship of mostly dead animals. In this section, I discuss the unfolding of agendas within which animals have been manipulated as data sources, educational tools, and trophies of human domination to provide background for how animal objects function in these spaces as

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[209] Alberti, "Constructing Nature Behind Glass," 74.

[210] Brenna, "Nature and Texts in Glass Cases," 37.

[211] Marsh, *Extinct Monsters in Deep Time*, 5; Haraway, "Teddy Bear Patriarchy; Michael J. Reiss, "The Relevance of Natural History Dioramas for Sociocultural Issues," in *Natural History Dioramas - Traditional Exhibits for Current Educational Themes*, eds. Annette Scheersoi and Sue Dale Tunnicliffe (Cham, Switzerland: Springer, 2019), 201-211.

[212] Samuel J. M. M. Alberti, "Introduction: The Dead Ark," in *The Afterlives of Animals: A Museum Menagerie*, ed. Samuel J. M. M. Alberti (Charlottesville: University of Virginia Press, 2012), 1.

denaturalized constructions of encounters with a natural world that has never existed. Finally, I describe how living animals have been incorporated into the constructed natures at CMNH.

4.3.1 Denaturalized Nature

The existence of living animals as museum objects in natural history museums follows a narrative shaped by imperialist and patriarchal agendas of collecting the exotic and affirming human superiority, which became collecting for scientific investigation, and has since shifted into an educational and entertainment mission of stewardship and interrelationship.[213] Scholarly interest in animals began to be formalized in cultures of the global north during the development of Wunderkammer, or "cabinets of curiosity" by the aristocracy in the 16th century.[214] In these formative years of our modern day conception of natural history, the practices of collecting, conducting research, and providing access to fossils, minerals, living and dead animals, and other specimens were generally established by white, male members of imperialist patriarchies, who defined their status through domination over the natural world and predicated their ethical orientation to the natural world on its ability to serve their goals.[215] Animals collected for their

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[213] Robert R. Janes, *Museums in a Troubled World: Renewal, Irrelevance or Collapse?* (London: Routledge, 2009); Dominic O'Key, "Why Look at Taxidermy Animals? Exhibiting, Curating and Mourning the Sixth Mass Extinction Event," *International Journal of Heritage Studies* 27, no. 6 (2021): 635-653, https://doi.org/10.1080/13527258.2020.1844276; Tony Bennett, *Museums, Power, Knowledge: Selected Essays* (London: Routledge, 2017).

[214] Edward P. Alexander, *Museums in Motion: An Introduction to the History and Functions of Museums* (Walnut Creek, CA: AltaMira Press, 1996), 41.

[215] Anna Omedes and Ernesto Páramo, "The Evolution of Natural History Museums and Science Centers," in *The Future of Natural History Museums*, ed. Eric Dorfman (New York: Routledge, 2017), https://www.routledge.com/The-Future-of-Natural-History-Museums/Dorfman/p/book/9781138692633. Researchers who study human-animal relations frequently trace these dominance-based relations back to Aristotle's hierarchy of animal subservience and Descartes' meditations on animals as emotionless machines as foundational to the imperialist justification of exploitation and subjugation practices. Augustine's argument, in line with Aristotle and the Stoics, that animals' supposed lack of rationality placed them outside of our human moral community encapsulates this justification. Other scientists and philosophers like Voltaire, Charles Darwin, and David Hume have argued to the contrary that animals are endowed with a reason and thought but these arguments seem to hold

display in Wunderkammer stood in for stories of new and conquered domains including the natural world.[216]

There was a transition around 1800 in the natural history industry "from natural history to the history of nature," or from the idea of telling stories about nature to the establishment of the science of nature. This was evidenced, if not spawned, by the introduction of Linnean nomenclature and taxonomy that shifted work in this area from a framework of storytelling into claiming systematic designations as fact.[217] This transition saw an increase in data-driven practices based on methods of induction that resulted in collecting and creating more quantitative data and imposing boundaries to the fluidity of nature through the declaration of labels and containers (both physical and conceptual).[218] This notable change in intention shifted museum practice toward systematic, scientific investigation through the collection of name-bearing type specimens that represented the standard of a species and developing encyclopedic collections of animal objects.[219]

Alongside the changes in intentionality, technological changes during the 1800s contributed to making mass collecting practices possible and European and American support of imperialist agendas made them acceptable. It was the "Age of Imperialism" wherein the United States deemed itself exceptionally poised to change the world and so they did through weapons and industrialization. Inventions like mass-produced steel, firing pins, and breech-loading meant that handheld guns were more durable, efficient, and accurate than ever before, increasing the ease

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less weight when the scientific justifications for killing animals are combined with the economic, entrepreneurial, and explorational drive of museum stakeholders.

[216] Alberti, "Introduction: The Dead Ark," 1.

[217] Staffan Müller-Wille, "Names and Numbers: "Data" in Classical Natural History, 1758–1859," *https://doi.org/10.1086/693560* 32, no. 1 (2017), https://doi.org/10.1086/693560, 110.

[218] Müller-Wille, "Names and Numbers"; David Sepkoski, "Towards "A Natural History of Data": Evolving Practices and Epistemologies of Data in Paleontology, 1800-2000," *Journal of the History of Biology* 46, no. 3 (2013), http://www.jstor.org/stable/42628791.

[219] Robert E. Kohler, "Finders, Keepers: Collecting Sciences and Collecting Practice," *History of Science* 45, no. 4 (2007): 428-454, https://doi.org/10.1177/007327530704500403.

of killing.[220] Transportation infrastructure was also rapidly changing in industrialized nations with similarly revolutionary inventions like steel rails and steam-powered locomotives and ships allowing the relatively fast and inexpensive movement of large shipments, which supported stockpiling when it came to museum specimens.[221]

Stockpiling "real" or "authentic" reference materials for the sake of science was seen as foundational to the research and educational missions of American natural history museums.[222] Museums wanted objects that they could hold onto, that they could control, that they could display and study, so mutability and ephemerality were undesired characteristics. For animal specimens, this mainly meant that denaturalization through death was required for stability. Museologist and cultural theorist Brita Brenna describes this as a contradictory method of saving nature: "Preserving nature in the museum was seen as a method of saving nature, even though it meant killing the animals in question… killing members of a threatened species was a way of securing for them eternal life."[223] Citing Simone de Beauvoir's lesson in *The Second Sex* that men achieve existence through risking life, Donna Haraway argues that this act of preservation does more than secure life; instead, "it is in the craft of killing that life is constructed" for human beings.[224]

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[220] Ian McKenzie, "Firearms," in *Encyclopedia of Human Development*, ed. by Neil J. Salkind, (Thousand Oaks, CA: Sage Publications, 2006).

[221] "Childs Frick Abyssinian Expedition." Smithsonian Institution Archives, accessed June 30, 2022, https://siarchives.si.edu/collections/auth_exp_fbr_eace0116; Duane Schlitter and Janis Sacco, "Childs Flick and the Santens Brothers: Creating a Superb Collection of African Mammals," *Carnegie Magazine*, May/June 1993, 18-23.A notable example at CMNH of such specimen collecting aided by turn of the century technology came from the hunting safaris of Childs Frick, a paleontologist and son of Henry Clay Frick. Between 1909 and 1912 Frick traveled to "British East Africa" twice seeking to "assemble a comprehensive collection of animals from various parts of Abyssinia." Given the technological affordances of the time and the impetus of encyclopedic collecting, his teams were enabled to kill, field prepare, and ship back over 600 mammals and 5,000 birds, many of which formed the basis of the African wildlife collections at CMNH and the Smithsonian Institution's United States National Museum.

[222] Eleanor Louson, "Taking Spectacle Seriously: Wildlife Film and the Legacy of Natural History Display," *Science in Context* 31, no. 1 (2018): 15-38, https://doi.org/10.1017/S0269889718000030.

[223] Brenna, "Nature and Texts in Glass Cases," 44.

[224] Haraway, "Teddy Bear Patriarchy," 23.

When these once living and unstable, now dead and contained animals were moved into the light of day for exhibition, the resulting museum displays were envisioned to accommodate an encyclopedic approach with specimens of dead animals. Already denaturalized through death and decontextualization, turning these animals into something inauthentic to their original state of being on an ontological level, these animals were often then also stripped of their natural bodies as exhibitions teams attempted to reanimate the lifeless and mutilated corpses through taxidermy, a process of preservation and display that removes the organic mechanisms that made life possible and replaces those once indispensable structures of life with metal bracing and cotton. Frozen in time as hybrids of life and death, their plumage will never have the same luster and shine, their fur will never change with the seasons, and they will have become symbols of "anthropogenic encroachment, displacement, endangerment and extinction."[225]

As Michael Ames argued when he coined the term "museumification," placing "history, nature, and traditional societies" in the frames of museum displays does more than expose visitors to a view of nature that they would not get to see otherwise, it sanitizes and plasticizes, further transforming the objects and their displays into impossible simulations of frozen realities.[226] According to Museum Anthropologist Sandra Dudley, "However museums choose to present objects, it is, then, inherent in the very nature of the museum that the material things displayed are almost always distanced from the viewer in ways that do not replicate human relationships with things in the outside world."[227] Through systematic grids of mounted taxidermy specimens that show taxonomic and morphological relationships between species through their proximal display,

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[225] O'Key, "Why Look at Taxidermy Animals?" 639-40.

[226] Michael M. Ames, *Cannibal Tours and Glass Boxes: The Anthropology of Museums* (Vancouver: UBC Press, 1992), 31.

[227] Dudley, *Materiality Matters: Experiencing the Displayed Object.* Working Papers in Museum Studies, no. 8 (University of Michigan, 2012), 2, http://hdl.handle.net/2027.42/102520.

visitors were meant to develop a scientific understanding of these relationships. We were meant to read the story of nature through reanimated, Romanticized carcasses in three-dimensional scenes of the animals' habitats which allow visitors to witness the "natural" world from the comfort of a museum gallery.[228] And through visitors' contemplation of imagined scenes based on popular assumptions about animals behavior and ideas, these displays of the dead were believed to have an affective impact, inspiring, as Smithsonian taxidermist William T. Hornaday, "feelings of admiration that often amount to genuine affection… and delight."[229]

The questionable effectiveness of these displays in asserting dominance and generating desired educational or emotional outcomes aside, the effect of death on display caused a stir among the public when the identity of natural history museums once again shifted toward greater emphasis on public engagement in the twentieth century. During this time, natural history museums in the United States took to a more entertainment and commodification-oriented approach to their displays, creating dramatic spectacles in habitat dioramas with impossible narratives from the natural world unveiling to paying customers curiosities and wonders of the world; an effective, albeit garish practice that made researchers uncomfortable but also funded their work through public patronage.[230] Museums also formally established menagerie collections of living animals kept captive for use in programming and exhibition as "a corrective to boring dioramas."[231] Not a standard or expected feature across all museums of this type, collections of

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[228] Karen A. Rader and Victoria E. M. Cain, *Life on Display (Chicago, University of Chicago Press, 2014).* 42-3.

[229] Rader and Cain, *Life on Display,* 42-3; William T. Hornaday and William J. Holland. *Taxidermy and Zoological Collecting; a Complete Handbook for the Amateur Taxidermist, Collector, Osteologist, Museum-Builder, Sportsman, and Traveller* (New York: C. Scribner's Sons, 1894), ix-x.

[230] Louson, "Taking Spectacle Seriously," 29-30; John C. Thackray and Bob Press. *Nature's Treasurehouse: A History of the Natural History Museum* (London: Natural History Museum London, 2013), 61.

[231] Karen A. Rader, "Interacting with The Watchful Grasshopper; or, Why Live Animals Matter in Twentieth-Century Science Museums," in *Animals on Display: The Creaturely in Museums, Zoos, and Natural*

living animals in "long-term captive display" mainly focused around smaller, more easily manageable species in terms of care and handling like insects, amphibians, reptiles, and small mammals escaped the lethality of standard natural history display.[232]

Operating similarly to modern menagerie and zoological parks, animals in these collections were to be cared for as they lived out their natural lifespans allowing for a liveness that complimented the existence of their dead counterparts in the galleries. These living creatures in galleries or programming offered visitors an illusion not just of nature, but an illusion of intimacy with nature because part of their appeal is that they broke free from the mausoleum mold of standard natural history displays. A visitor could watch them move, speak to them, hear them make sounds, and watch the animals live out their lives. Through living animal displays and programming, a visitor could interact with, and sometimes even touch, a nature that had been brought under human control for human use.

Since the programmatic incorporation of living animals began in earnest in the 1920s, their justification and use have gone through several iterations hand in hand with educational and popular influences of their time. In modern day instances of living animals in natural history museums, museums who incorporate living collections into their work claim that their use of moving animal objects increases the public's "sustained situational interest," a commonly cited hurdle with museum displays.[233] They consider live animals to be gateways to developing

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History, ed. Liv Emma Thorsen, Karen A. Rader, and Adam Dodd (Pennsylvania: Pennsylvania University Press, 2013): 177.

[232] International Council of Museums, *ICOM Code of Ethics for Natural History Museums* (Paris: International Council of Museums, 2013), https://icom.museum/wp-content/uploads/2018/07/nathcode_ethics_en.pdf.

[233] James Kisiel et al., " Evidence for Family Engagement in Scientific Reasoning at Interactive Animal Exhibits," *Science Education* 96, no. 6 (2012): 1047-1070, https://doi.org/10.1002/SCE.21036; G. Kimble, "Children Learning About Biodiversity at an Environment Centre, a Museum and at Live Animal Shows," *Studies in Educational Evaluation* 41 (2014): 48-57, https://doi.org/10.1016/j.stueduc.2013.09.005; Konstantinos J. Korfiatis

emotional responses that encourage a conservation mindset. Adding displays and programming with objects that move, that are unpredictable, that are constantly in change makes it so that every moment a visitor spends is different.[234] So, too, the visitor becomes part of the display or program, instead of simply an observer of a nature that has never existed in dioramas, they become an audience member who can connect with another living being.

4.3.2 Alternative Approaches

Campaigns of death have increasingly been subject to scrutiny across natural history institutions in the past 150 years as these institutions have transitioned into centers devoted to educating the public about biodiversity, promoting sustainability, and protecting our environment.[235] Collecting voucher specimens, which are "parts of, or wholly preserved plants or animals collected and worked on during the course of a study," remains intact and argued for by many scientists especially for their value in developing conservation strategies.[236] With the development of technologies like high resolution image capturing, implementation of sustainability-minded fieldwork approaches, more focus on local animal populations, and increased ease of travel during second half of the 20th century, the killing of animals, especially large animals, for museum collections has had to be weighed against economic and technological

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and Sue Dale Tunnicliffe, "The Living World in the Curriculum: Ecology, an Essential Part of Biology Learning," *Journal of Biological Education* 46, no. 3 (2012): 125-127, https://doi.org/10.1080/00219266.2012.715425.

[234] "Live Animal Encounter," Carnegie Museum of Natural History, captured via Wayback Machine on April 13, 2021, https://web.archive.org/web/20210413113133/https://carnegiemnh.org/explore/live-animal-encounters. CMNH harps on this angle in their advertising for LAE with phrases like "each week is unique" and "each show is a totally different experience!"

[235] Omedes and Páramo, "Evolutions of Natural History Museums."

[236] F. C. De Moor, "The Importance of Voucher Specimens," *Southern African Journal of Aquatic Sciences* 22, no. 1/2 (1996): 117, https://doi.org/10.1080/10183469.1996.9631380.

changes resulting in a reconsideration of the necessity of such practices with others in the scientific community now arguing that it is entirely possible to obtain sufficient type material and without using "dead bodies" as the gold standard of species description and tracking.[237]

Changes in cultural and societal attitudes have also shifted support away from accepting animal donations that were hunted for sport. For example, in 2016, a Pittsburgh doctor was forced to close the doors of his practice after he was accused of illegally killing a lion on a 2015 hunt in Zimbabwe.[238] Though the lion was not donated to the museum, the controversy forced CMNH to investigate four specimens donated to the museum by the doctor.

The consideration of the aforementioned practicalities alongside changing social mores and ethical insights surrounding our time of "conservation crisis" have encouraged the adoption of less-lethal approaches for collecting data and exhibiting about animals though it remains to be seen if any will become long-term strategies.[239] When specimen collecting is still practiced, zoological parks, menageries, and other institutions devoted to caring for living animals fill in as sources for specimens. Although these institutions also have deep roots in problematic imperialist agendas, the pipelines of animal production from birth to death in captivity to their afterlives in museums

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[237] Andrew G. Hope, Brett K. Sandercock, and Jason L. Malaney, "Collection of Scientific Specimens: Benefits for Biodiversity Sciences and Limited Impacts on Communities of Small Mammals," *BioScience* 68, no. 1 (2018): 35-42, https://doi.org/10.1093/BIOSCI/BIX141; Frank Thorsten Krell and Stephen A. Marshall, "New Species Described from Photographs: Yes? No? Sometimes? A Fierce Debate and a New Declaration of the ICZN," *Insect Systematics and Diversity* 1, no. 1 (2017): 3-19, https://doi.org/10.1093/ISD/IXX004; Patrick O. Waeber et al., "On Specimen Killing in the Era of Conservation Crisis - a Quantitative Case for Modernizing Taxonomy and Biodiversity Inventories," *PLoS ONE* 12, no. 9 (2017), https://doi.org/10.1371/JOURNAL.PONE.0183903; Ben A. Minteer et al., "Avoiding (Re)Extinction," *Science* 344, no. 6181 (2014): 260-261, https://doi.org/10.1126/SCIENCE.1250953.

[238] Bob Allen, "Local Doctor Accused of Hunting Lion Previously Hunted Elephants & Other Big Game," *CBS News Pittsburgh*, August 3, 2015, https://pittsburgh.cbslocal.com/2015/08/03/local-doctor-big-game-hunting.

[239]Hope, Sandercock, and Malaney, "Collection of Scientific Specimens"; Waeber et al., " On Specimen Killing," 2; Kevin Winkler, "(Re)Affirming the Specimen Gold Standard," *University of Alaska Museum Department of Ornithology* (blog), April 20, 2014. https://www.universityofalaskamuseumbirds.org/reaffirming-the-specimen-gold-standard. Ornithologists seem to be particularly interested in debating the merits of active specimen collection.

are generally seen as more humane and conservation minded practices of object collection than hunting expeditions in the wild especially for large animals.[240]

Living collections used primarily in education and exhibition, as opposed to data collection or experimentation, do appear to escape the immediate lethality of museum preservation practices mentioned above because living collections operate wherein animals are cared for as they live out their natural lifespan. However, their capture, displacement, relocation, and ongoing captivity has a similar denaturing impact in that the animals are no longer representatives of their natural habitat, behaviors, or relations. They live in cages, have had treatments conducted to make them safer for human handling, and are trained to be around human handlers. Ethical arguments surrounding living collections suggest that, in some ways, captive living may be just as violent a practice in terms of upsetting the natural order as killing for collection.[241]

Similar technological changes that have promoted the use of alternatives for killing have also been implemented instead of collecting living animals at many natural history museums to accomplish similar goals of re-contextualizing the dead animals with living versions. These include using video technologies for capturing and playing scenes from animals in the wild through monitors in gallery spaces and developing resources based on observations of living animals in the wild to accompany the "dead nature collected by dead men."[242] Negotiating how to incorporate

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[240] Will J. Richard, "How and Why Did These Animals Die?" *UCL Culture Blog* (blog), University College London, April 9, 2016, https://blogs.ucl.ac.uk/museums/2016/04/27/how-and-why-did-these-animals-die; "A Timothy Ikin, Conservation Ethic and the Collecting of Animals by Institutions of Natural Heritage in the Twenty-First Century: Case Study of the Australian Museum," *Animals* 1, no. 1 (2011): 176-185, https://doi.org/10.3390/ANI1010176.

[241] Stephen Bostock, *Zoos and Animal Rights: The Ethics of Keeping Animals* (London: Routledge, 1993); Andrew Linzey ed. *The Global Guide to Animal Protection* (Champaign, IL: University of Illinois Press, 2013), http://www.jstor.org/stable/10.5406/j.ctt2tt9r9; Michael D. Kreger and Michael Hutchins, "Ethics of Keeping Mammals in Zoos and Aquariums," in *Wild Mammals in Captivity: Principles & Techniques for Zoo Management*, ed. D. Kleiman, K. V. Thompson and C. K. Baer, 3-10 (Chicago, IL: University of Chicago Press, 2010).

[242] Henry David Thoreau in Alberti, "Introduction: The Dead Ark," 5.

"tech" into public-facing galleries, however, also comes with caveats. On one hand, the use of videos require staff with appropriate skill sets and machinery to boot. On the other hand, videos of animals may not provide the raw, unfettered look into the wild as these videos often suppose. Not only are the observer effect and staging in wildlife filmmaking considerable hindrances to claims of providing peeks into the natural world, but there is also the notion that videos capturing images of once living animals in once existing situations result in videos not of the living, but, yet again, in memorials of the dead.[243]

4.3.3 Living Animals at CMNH

Founded in 1895 and opened to the public in 1896 as the Department of the Museum at the Carnegie Institute, the now-named Carnegie Museum of Natural History (CMNH) was created by industrialist Andrew Carnegie as a center for the scientific study of the earth's history.[244] From its earliest days, the museum sought to study and educate the public about the natural world using specimens and artifacts gathered from across the globe, eventually becoming a hub for scientific and anthropological exploration and research in North America during the first half of the 20th century. The CMNH collections now contain over 22 million objects collected and preserved for collection-based scientific research, to promote scientific literacy through public exhibitions and programming, and for posterity so that future generations can continue to admire and learn from these objects.[245]

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[243] Louson, "Taking Spectacle Seriously."

[244] Robert J. Gangewere, *Palace of Culture: Andrew Carnegie's Museums and Library in Pittsburgh* (Pittsburgh: University of Pittsburgh Press, 2011), 174.

[245] "About Carnegie Museum of Natural History," Carnegie Museum of Natural History, captured via Wayback Machine on March 14, 2022,

In the early days of the museum, living animals were kept in labs and offices as trophies of conquest, scientific investigation, and sometimes brought out for educational tours. Per the time, these animals were not formally accessioned as collection objects until their death and were treated haphazardly in several published accounts. Gustav Link, a famed animal wrangler and CMNH taxidermist for 19 years, in one example of irresponsible animal care, died in 1916 from a rattlesnake bite incurred from his personally collected Ohiopyle rattler during a routine class tour.[246] A student noticed the bite and alerted Link who decided to ignore it until the venom had spread beyond treatability. Keeping animals for personal or scientific use ebbed and flowed throughout the years depending on the needs/desires of collections, researchers, and management. The first gallery size installment of animals as living dioramas came around in the late 90s and followed the historical trend of using animals as research subjects while doing double duty as a public exhibition.

Before the creation of the R.P. Simmons Gallery in 2005 which now hosts revolving temporary exhibits, the museum had a "bug zoo" in that location.[247] Developed as a complement to the 1998 *Backyard Monsters* exhibit and work conducted by museum researchers, the zoo included live displays of dermestid beetles cleaning the flesh from animal carcasses (affectionately referred to as "raccoon jerky" by the staff), paper wasps creating nests out of colorful scraps of paper, and a leaf cutter ant colony cultivating fungus for food.[248] Also on view was a working beehive where the bees had free movement between their enclosed hive and the nearby parks

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https://web.archive.org/web/20220314121519/https://carnegiemnh.org/explore/about-carnegie-museum-of-natural-history.

[246] "Dies from Snake Bite: Pittsburgh Instructor Nipped While Showing Rattlesnake to Pupils," *New York Times*, August 17, 1917.

[247] Julie Hannon, "Living in a Bug's World," *Carnegie Magazine*, Summer 2018, https://carnegiemuseums.org/carnegie-magazine/summer-2018/living-in-a-bugs-world.

[248] Scientific Preparator in Entomology at CMNH, conversation with author, April 19, 2021.

outside the museum. Along with the behind-the-scenes work of the flesh-eating beetles, commonly used as museum employees during the process of specimen preparation, many of the species were from the research-oriented "bug rooms," one of which was featured in the 1990 film *Silence of the Lambs*, where scientists regularly reared insects from eggs, larvae, and pupa through to adulthood for research.[249] The zoo was cared for by entomologists in the Invertebrate Zoology section who were using the insects in their own research and utilized them as an educational resource for showing visitors natural processes in real time. In most instances these natural processes would not be viewable in the wild without both the animals and the human viewers being put in danger.

The end of the bug zoo came without much fanfare. Collections staff who worked with this display expressed some fondness and nostalgia for the project, but ultimately concluded that the time caretaking and cleaning the exhibits shifted too far from being a part of the research process into an inconvenience that cut into their usual work tasks. These were animals with short lifespans that required attention through each life stage, regular replenishment via capture or purchase, and required maintaining a wide variety of dietary needs. As such, maintaining a display collection of bugs without dedicated staff became more of a hassle to those behind the scenes than was deemed worthy for the educational and entertainment value of viewing bugs living their lives on display.

Avoiding the inconvenience of maintaining living creatures, the museum has also utilized video technologies to bring dynamic representations of the living into the galleries. Scattered throughout the museum are embedded television monitors that show documentary-style short videos of living animals performing behaviors or representing some theme that relates to the gallery exhibits while still alive in the wild with narration explaining what is happening on the screen. These animals are most likely now deceased, but they were once alive and observable by

[249] Scientific Preparator in Entomology at CMNH, conversation with author, April 19, 2021.

humans supposing a more life-like connection than the stuffed specimens in the wildlife halls. In some cases, though, the animals represented in the video have been extinct since long before humankind came around. In these cases, visual effects professionals use knowledge of anatomy and the skeletal structures that scientists have found of the animals to recreate their behaviors and movements through animation.[250] At CMNH, these animations are stitched together with "talking head" scientist interviews and projected onto walls in galleries full of extinct animals.

The department of Lifelong Learning took a different approach than that of the invertebrate displays in the "bug zoo" and the in-gallery videos to design the Living Collection by rescuing and purchasing living vertebrates (aside from some cockroaches) for educational purposes and, in several cases, rehabilitation for public programming and outreach. Underneath the surface, the Living Collection began from the egotistical motivations of several staff members who appreciated the attention and entertainment value the creatures brought to themselves and the museum, according to several accounts with staff who were working in the department during the collection's creation. In view of the public, however, the programs featuring live animals were advertised as promoting humane treatment of animals and sustainable practices by "activat[ing] a lifelong love of nature and science" and teaching visitors "teach people about their wild counterparts."[251]

Staff have published research about the care of this collection, but, in general, it operates more like those at zoological parks with a focus on animal care and education than on animal

[250] Brendan Body, "Flight of the Living Dead: How Animation Brings Extinct Species Back to Life," *The Conversation*, November 2, 2017, https://theconversation.com/flight-of-the-living-dead-how-animation-brings-extinct-species-back-to-life-86737.

[251] O'Toole, "Animal Attraction."

objects as research material like in past iterations of living animals at CMNH.[252] The collection managers, with backgrounds in animal husbandry and educational programming, have opted for a private living experience for the animals where their day-to-day living is not part of their public enactment. Their care happens largely behind closed doors, and they are only brought on view for regularly scheduled public-facing performances including Live Animal Encounters.

4.4 Affordances Across Live Animal Enactments

The living animals in the collection are referred to as "animal ambassadors" because they are intended to act as individual representatives of their entire species and the relationship between humans and animals during educational programming. These habituated versions of wild animals are presented in show-form to expose humans to tamed representations of the natural world with the intent that exposure and informational context will encourage empathy and understanding. When situated in LAE, animals become representatives of the representational histories of the institution. They are integrated into the history of natural history museums and their supposed meaning claimed by the museum is reliant upon the networks and practices of human-animal relations displayed throughout the museum.

In this section, I examine how onsite LAE are physically positioned as programs of the living among histories of the dead and how the themes of human domination, authenticity, and intimacy inform the enactment by developing a conceptual contextualization and priming during

[252] Leslie Wilson, "Postoperative Care and Physical Rehabilitation Following a Hemilaminectomy in a Young Adult Brown-Nosed Coatimundi (Nasua Nasua), " in *Annual AZVT Conference Proceedings* (2020). Wilson's rehabilitation of the museum's coatimundi is one example of this research.

the museum visit. I then detail CMNH's technologically-mediated approach to these histories and, through the identification of affordance transfer and loss, how the online Virtual LAE was overridingly shaped not by the history of human-animal relations, but of the constraints of CMNH's technical prowess in combination with a cursory understanding of the program's situated significance.

4.4.1 Onsite Live Animal Encounters

To reach Earth Theater, the location of the Live Animal Encounter program on the furthest end of the museum from the ticketing desk, visitors journey through the social, political, and material histories revealed in the presentations of exhibition halls. Following the chronological path prescribed by the layout and suggested by staff members, one sees the geological formation of natural fuels and how they are obtained by humans. They come upon fossilized bones mounted into imagined action scenes determined partly by the agreed upon scientific evidence, partly by expert consensus about the more questionable aspects of the evidence, and partly by the institutional bounds that force the displays into stagnancy even as the scientific community adjusts their views.

Along with fossils of ancient life, visitors are also exposed to reanimated dead creatures. Some specimens that are only bones have been reconstructed through graphical representation like the illustrated images of living dinosaurs in *Dinosaurs in their Time* while more recent animal skeletons have received an on-the-bone treatment of being displayed half bone, half reconstructed plastic flesh in the Mesozoic and Cenozoic eras. On the alternate route, visitors travel through a hall of dead birds, some of which have been given afterlives in CMNH's *Bird Hall* as study skins on view, which are specimens prepared for storage, while others have received the full taxidermy

mounting process wherein the animals' skins, feathers, and claws, are stuffed to simulate their musculature and mounted on human-made frames to appear frozen in action. Visitors can then pass through the *Halls of North American and African Wildlife* lined with life-like dioramas of animals in representations of their natural habitats. Several of these have been designed to be immersive dioramas where the visitors are inserted into the scene (Figure 1).

Figure 1 Immersive Alaskan Brown Bear diorama.

Whichever path the visitor takes, they will undoubtedly be confronted with human-animal relations as historically represented by natural history museums in the *Discovery Basecamp* waiting area for LAE. When visitors gather around the kiosk and theater doors about 15 minutes prior to the show, they wait in an area surrounded by "taxidermy boxes" which feature various small to medium sized specimens (Figure 2). I describe them in detail here because they are exemplary of human relations shaped by natural history museums. These boxes were constructed with four panels of see-through plexiglass and a leather handle on the top visually suggesting that they are both mobile and meant to be examined in the round, which is, in fact, the case. According to the staff, these boxes were designed to be manipulated, moved, and, given that children are the intended audience, they have been made sturdy enough to be lightly tossed around. Inside each box is a solitary or paired taxidermy animal specimen. The idea behind the boxes is that a visitor can reorganize the specimens to be put in relation with one another to see the differences and similarities, view the animals from multiple angles to provide opportunities for multiple types of observation strategies, and make inferences regarding the specimen's habitat and living circumstances to simulate how scientists ask questions about the natural world. While this may be an effective, even admirable, intention these boxes simultaneously evoke these historical beginnings of natural history museums where the spirit of human domination over the natural world flourished and a Victorian obsession with death was rampant.

Ahead of the pandemic, Discovery Basecamp also had transportable "specimen totes" with which children were encouraged to explore plastic storage boxes that included items from animals like skulls, pelts, paw print molds as well as non-animal objects like books and related informational resources. Though some of the boxes included full specimens encased in resin or other durable material for handling, the majority of items in the specimen boxes went further than

Figure 2 Examples of taxidermy boxes.

Figure 3 Specimen totes in disarray after use.

the taxidermy boxes in shaping discussion of similarities and differences by disassociating the parts from the whole (species, specimen, etc.). Instead, they suggested categories for examination that promote cross-species comparison like fur type, foot shape, etc. Again, while perhaps laudable in intention to encourage critical thinking about the natural world and sensory museological approaches to visitor engagement, multiple floor staff mentioned that these boxes are frequently handled in a rough and "disrespectful" manner by both children and their accompanying adults meaning that items are often not treated with caution and left in disarray when users are finished with them (Figure 3).[253]

When visitors are permitted to enter the theater, they have already witnessed a plethora of ways that animals have been positioned in relation to humans before seeing the living animal ambassadors. By the time of the show, the visitor has been conditioned to view their human relationship with nature as hierarchical, manipulated, authentic, fake, distanced, and intimate all the while being placed in compromising positions as stewards, as murderers, as learners, as exploiters, as creators, as deceivers, etc. And these relations will again be impressed when the visitor leaves the encounter to follow the other route out.

Consistently formatted since its debut, the show portion of the LAE begins once visitors have taken their seats in Earth Theater, a position that transitions visitors into members of a collective audience. A trained animal care team member then positions themselves behind a covered table at the front of the theater with several rows of stadium style seats facing them. The handler begins by introducing the audience to the collection and the show. This portion sets up expectations of audience behavior as well as ramping up excitement for the animals with which

[253] Gallery Experience Presenter I at CMNH, conversation with author, January 27, 2021

they are about to have a controlled, yet intimate experience with denaturalized versions of wild specimens.

Five or so animals have already been staged under the table. One-by-one, the handler retrieves an animal to share information about the species alternating between topics like their natural habitat, what their life would be like if out in nature, the imposition of humanity, and how they relate to the non-living scientific collections at the museum. Stories and facts about the specific animal itself are also presented, the framing of which permits the handlers to justify museum practices regarding the Living Collection (in terms of acquisition and care) as well as promoting empathic responses by developing personal relationships between audience members and the animals.

Throughout the 30-minute presentation, the handler moves around the theater to provide alternative angles for viewing while the audience is encouraged to ask questions, take pictures, and react to semi-scripted cues from the handlers (Figure 4). The dynamic presentation and audience interaction ensures that every audience member has different views of the animals and relatively immediate answers to any burning questions. When the animals are put away and the Q&A session concludes, the audience leaves the theater to become enmeshed in the static constructions of nature on display in the galleries.

Figure 4 Onsite Live Animal Encounter.

4.4.2 Online Live Animal Encounters

Virtual LAE employs the skeleton of the 30-minute LAE format wherein a member of the animal care team holds the animals up one-by-one while information about the animal is provided. Instead of a theater audience, the presenter faces a camera connected to participants using the Zoom video teleconferencing software program (Figure 5). The handler and the animal are stationed in front of a playfully colored illustration of a nondescript outdoor environment and framed by the confines of a camera lens set several feet away. During the Virtual LAE, the staff member on camera manages the presentation of the animal ambassadors in response to prompts from a narrator who runs the encounter as the Zoom room host. The narrator acts as a program

guide supplying the informational content as well as moderating questions posed from the audience through the chat box. All the while, animals and the animal handler stay centered and distanced from the camera on screen and most at-home viewers keep their cameras turned off in stark contrast to the handler-ambassador movement and audience interactivity in onsite LAE.

Also in contrast is the conceptual conditioning in the onsite experience. The museum controlled experience of the Virtual LAE now officially begins in the ubiquity of an internet browser when the visitor accesses the main CMNH website. During the data gathering phase of this research, the layout and site map of the CMNH website changed multiple times, so the procedure for getting to the Virtual LAE varied rather drastically depending on access dates. When the museums were first closed, navigating to the CMNH website would point the visitor toward a

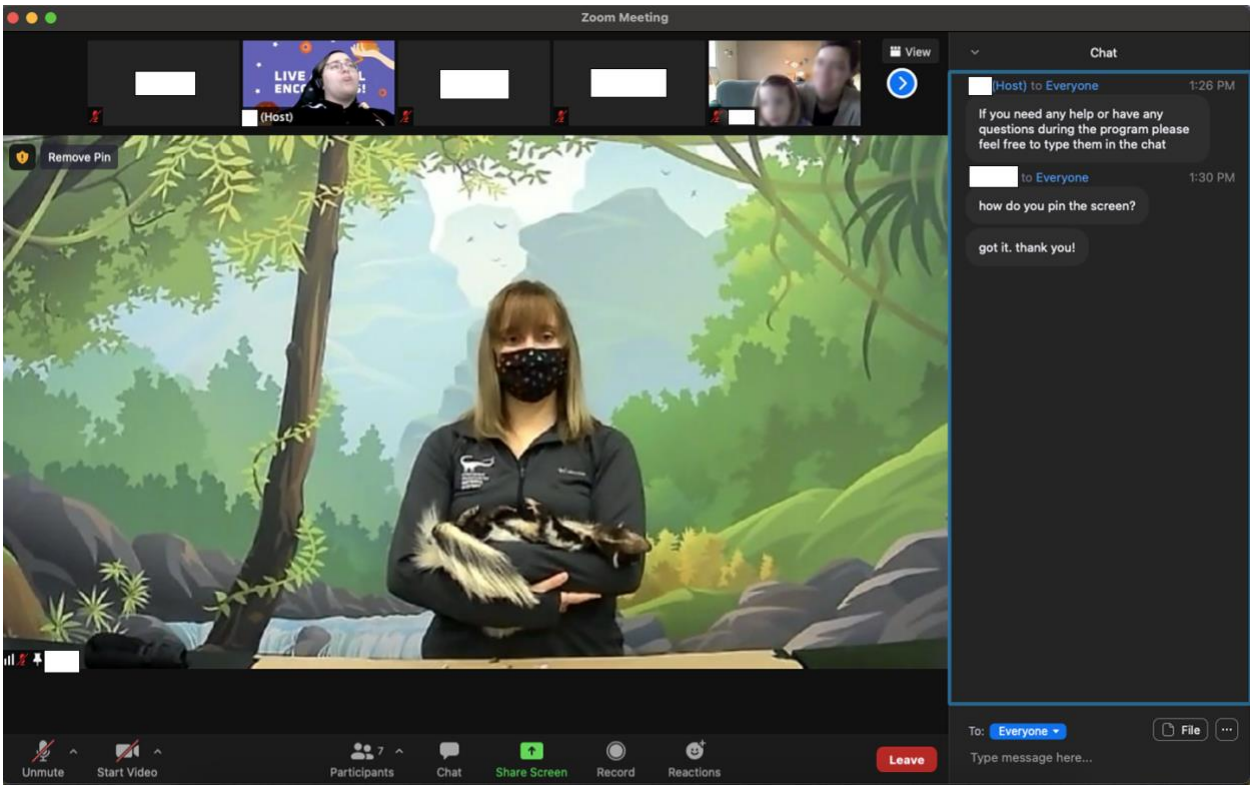

Figure 5 Screenshot of Online Live Animal Encounter via Zoom.

collective resource page for all four Carnegie Museums of Pittsburgh called "Carnegie Museums at Home." This directory-style page listed resources from all four museums in one location combined under a united "From Home" front. This version led visitors to a "Living Collection" webpage that included vignettes about each animal and their species along with links to YouTube content about the collection. During this time, Virtual LAE was not yet running. At a test run on July 10, 2020, visitors had to navigate to the "Learn" menu item, select "Educator Resources," select "Visit the Living Collections," and the prompt to get to the page devoted to the Living Collection. However, to access the Virtual LAE event description and sign-up form, the visitor needed to navigate to the "Explore" menu item, then select "Live Animal Encounters." Additionally, if a visitor used the search function during this time, the only results referred visitors back to blog posts instead of the event.

Virtual LAE began in earnest as a weekly event on August 5, 2020, a visitor would navigate to the events calendar to find the sign-up form.[254] Unpredictable navigation and unproductive search mechanism made it so that the journey to the Virtual LAE, each step, each click, each attempt to navigate toward the encounter was a struggle that revealed awkward design and poor website experience instead of the intricacies and histories of human-animal relations of museum practices.

Finally on the CMNH branded page for Virtual LAE, the page contained minimal information about the program, a single video about an animal in the Living Collection, a link to CMNH's YouTube channel, and a button prompting the visitor to register for the event through a ticketing form. Once registered, the rest of the enactment took place outside of any Carnegie

[254] I mentioned accessing Virtual LAE in conversation with thirteen staff members who knew about the program. Those who tried to access the sign-up were never able to find the landing page for the sign-up and many had never seen the "Living Collection" web page.

specific platform. At the inception of the program, there had been no dedicated exposure to the themes of the museum and any serendipitous engagement with online content is unmapped. All necessary logistics communications at this point are delivered via e-mail including the Zoom link for the program and the program itself happens in the Zoom meeting room described above.

4.4.3 Affordance Identification

During the initial Covid-19 museum closure, CMNH had little choice but to shift into creating online content in lieu of on-site visitation and events since they wanted to continue to have educational relationships with their public. After realizing that the pandemic was going to last longer than a few weeks, CMNH's engagement strategy during the pandemic shifted to include adapting routine or already planned on-site programming for online viewers. This indicated moving programming like lecture series and field trips to video conferencing platforms and converting activities and events into series of webpages and social media posts. Once the museum reopened in late June, many of these changes remained in place because the limited capacity and social distancing mandates restricted the gathering of groups and personal safety remained a concern.

The constant demand for animal care and the animal care team's expertise in public education unintentionally set LAE up to be a prime candidate for digital remediation during these "Museum from Home" pandemic initiatives. The objects used in LAE were living creatures that required an uninterrupted schedule of care unlike their static counterparts that did not require any particular maintenance or human contact during pandemic restrictions. Additionally, virtual LAE filled a programming gap that the team had been so accustomed to producing before the pandemic. The Lifelong Learning team at CMNH is responsible for a variety of onsite public engagements

including Super Science Saturdays, 21+ themed nights, birthday parties, and other events catering to the general audience of the museum. Being able to provide Virtual LAE afforded the team the opportunity to continue their work with the public through the Living Collection.

However logistically convenient in terms of continuing animal care and supporting programmatic goals, the decisions made during the creation of the online remediation altered many of the defining features of LAE. These changes formed two main groups of affordance alterations: liveness and contextual priming.

"Live" in the LAE title is a double entendre, meaning both alive-ness and liveness, the latter of which is a container that encompasses the relational qualities between the actors, which include the audience, the animals, and the presenters, during an LAE. "Liveness" was originally introduced in debates regarding the privileged position of liveness in *the repertoire* versus *the archive,* or performance versus documentation respectively, to describe the "bodily co-presence of actors and spectators" where performance emerges.[255] Through the work of Philip Auslander, Rebecca Schneider, Sarah Bey-Cheng, and Jennifer Parker-Starbuck among others, the concept has taken on a more nuanced, less binary, composition in the "mediatized" world as the interface, interaction, and connection between the audience and a performance whether that experience is in

[255] Diana Taylor, *The Archive and the Repertoire: Performing Cultural Memory in the Americas* (Durham: Duke University Press, 2003); Peggy Phelan, *Unmarked: The Politics of* Performance (New York: Routledge, 1993); Erika Fischer-Lichte, "The Art of Spectatorship," *Journal of Contemporary Drama in English* 4, no. 1 (2016): 164, https://doi.org/10.1515/JCDE-2016-0013; Suk-Young Kim, "Liveness: Performance of Ideology and Technology in the Changing Media Environment," in *Oxford Research Encyclopedia of Literature* (Oxford University Press, 2017), https://doi.org/10.1093/ACREFORE/9780190201098.013.76.

real-time, in the flesh, recorded and played back, or viewable through a digital technology that shifts space and time.[256] In this sense, it is a quality of both the immediate and the mediated.[257]

According to the handlers, the animals did not perceive any real change to their remediated roles in LAE apart from the regular ambassadors, mostly the skunks and the sun conure, adjusting their behavior to account for the change in frequency and timing of the virtual events.[258] They simply appeared before the camera in the same hands to which they have become accustomed. The roles of the humans, on the other hand, did change due to the public health requirements of pandemic measures and the limitations of the technologies used.

Because scientific guidance regarding human to animal transmission of COVID-19 was still being considered, the animal handlers always wore masks around the animals. When doing so, they found it was unduly challenging to provide verbal delivery with a mask covering their mouths or to handle the interactive communication aspects with the audience while holding the animals.[259] So, while the onsite LAE required only one person to manage the animals and the audience interaction, two staff members were deemed necessary to fulfill similar modes of engagement to the online LAE. Safety measures at the time also recommended that the staff-follow social distancing protocols which meant that multiple computers had to be utilized. This, in concert with the awkwardness of sharing the same space while using separate computers due to mismatched syncing and other technological disturbances, required the staff members to be physically separated, relying on the use of cues through computer speakers.

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[256] Philip Auslander, *Reactivations: Essays on Performance and Documentation*, (Ann Arbor: University of Michigan Press, 2018); Philip Auslander, *Liveness: Performance in a Mediatized Culture*, 2nd ed. (New York: Routledge, 2008); Rebecca Schneider, *Performing Remains: Art and War in Times of Theatrical Reenactment.* (Florence: Routledge, 2011); Sarah Bay-Cheng, Jennifer Parker-Starbuck, and David Saltz, *Performance and Media* (Ann Arbor: University of Michigan Press, 2015).

[257] Auslander, *Reactivations*, 66.

[258] Jessica Sperdute, interview with author, January 12, 2021.

[259] Sperdute, interview with author, January 12, 2021.

In terms of audience roles, the use of Zoom for a live program, as opposed to a recorded program, theoretically allowed a similar flexibility and responsiveness between the audience and the staff that is considered important to the informal learning style that LAE is built around.[260] The audience, as usual for all LAE, were prompted to ask questions throughout the program, but an additional aspect was that they could do so through both the written chat feature and orally by raising their digital hands and unmuting when called upon by the narrator. This contributed to what some in the literature about online pedagogy see as more equitable engagement practices by allowing multiple modes of communication and by flattening the contributions of more forceful audience members through a turn-taking approach (i.e., instead of hands shooting in the air from excited kids in the midst of audience chatter, Zoom participants contribute through written communication via the chat feature or a process of being called upon and unmuting).[261]

This noticeably "less chaotic" audience interaction resulted in less interactivity overall in terms of number of questions and immediate audience feedback through clapping, or other sound-based expressions.[262] While similar types of questions were asked in Virtual LAE as in the onsite version and there were some occasions of highly engaged conversations, Zoom participants more often remained muted with their cameras turned off providing less direct or indirect interaction with the program than during onsite LAE. The challenges inherent to the loss of face-to-face interaction noted here have also been noted in research concerning online learning. Scholars in this

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[260] Sperdute, interview with author, January 12, 2021.

[261] Shantanu Tilak and Logan Pelfrey, "Critical Reflection in Online Education: Habermas, Marcuse and Flattening 'Classroom' Hierarchies During Covid-19," *Digital Culture & Education* (June 2020), https://www.digitalcultureandeducation.com/reflections-on-covid19/online-education-during-covid-19; Nadia Naffi et al., "Online Learning During Covid-19: 8 Ways Universities Can Improve Equity and Access," *The Conversation*, September 30, 2020, https://theconversation.com/online-learning-during-covid-19-8-ways-universities-can-improve-equity-and-access-145286.

[262] Sperdute, interview with author, January 12, 2021.

area recommend additional preparation to accommodate the online environment and increased facilitation in real-time to support successful online interactions.[263]

Producing a program that was available over the internet also changed the logistics for attendance. People around the nation were able to attend Virtual LAE from places as far as Alaska without so much as leaving their couch. While others could become "regulars" by simply signing up and joining the meeting every week without gearing up for a whole museum trip, a benefit that has also been cited by students in the literature regarding online learning without attending classes in person.[264] The distanced availability of the programming was described as a "major reward" by the staff who planned the programming, although the numbers for both non-locals and regular attendees was considerably lower than onsite LAE. [265]

The other group of affordance changes was that of contextual priming. Contextual priming, a phrase that refers to my argument woven throughout this chapter regarding how natural museums instill situated fabrications of nature that shape all accompanying enactments, is a throughline in this dissertation. In the case of LAE, the contextual priming that placed onsite LAE within the historical and conceptual stories told by CMNH, through their constructions of nature, was offset by being situated in CMNH's online apathy. The online development and deployment of Virtual LAE descends from and exemplifies a lineage of rudimentary online enactments created without any noticeable consideration of the needs inherent to online adaptations.

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[263] Julie E. Boland et al., "Zoom Disrupts the Rhythm of Conversation," *Journal of Experimental Psychology: General* 151, no. 6 (2021): 1272-82, https://doi.org/10.1037/XGE0001150; Marcia Rapchak, "When Online Instruction Doesn't Measure Up: How Can You Tell, and What Should You Do?" *Journal of Library & Information Services in Distance Learning* 13, no. 1-2 (2018): 150-158, https://doi.org/10.1080/1533290X.2018.1499248.

[264] Cheryl Brown et al., *Report: University Students Online Learning Experiences in Covid-Times*, Student Online Learning Experiences (2021), https://studentonlinelearningexperiences.wordpress.com/report.

[265] Sperdute, interview with author, January 12, 2021.

The adoption of digital technologies at CMNH had a slow start. By the time CMNH incorporated electronic screens and the questionable installation of gendered "mobots" as robotic gallery guides in the late 1990s, corresponding institutions had already experimented with digital technologies like handheld guides and multimedia kiosks since the 1950s.[266] Under the controversial leadership of physicist astronaut Jerome Apt (CMNH Director 1997-2000), the museum partnered with librarians who specialized in web development at the Carnegie Library of Pittsburgh to create and host the CMNH website that launched in 1997 and began revamping exhibition strategies to incorporate interactive, dynamic media like touch screens and video installations.[267] CMNH's digital engagement strategies, both online and onsite, grew stagnant after Apt's departure, stuck in 1997 online approaches at CMNH where online content has been intended to "whet your appetite for a future visit," not be an experience in its own right.[268] In online practice, this approach has catered to content that directs online traffic to purchase tickets for onsite visitation, instead of creating an online resource of scientific knowledge and programming, with minor adjustments to the overall strategy to accommodate the emergence of social media. Changes made to online strategies during the Covid-19 pandemic were the first in decades at CMNH.

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[266] Tallon, "Mobile, Digital, and Personal"; Gangewere, *Palace of Culture,* 184; Illah. R. Nourbakhsh,, Clayton Kunz, and Thomas Willeke. "The Mobot Museum Robot Installations: A Five Year Experiment," in *Proceedings 2003 IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2003. https://doi.org/10.1109/IROS.2003.1249720. The Mobot project was a partnership with a team of robotics students from Carnegie Mellon University to develop gendered museum robot installations wherein "socially interactive" robots, questionably assigned genders and thus named Chips and Sweetlips, were deployed to replace docents in the two of the museum's galleries. For more on the project.

[267] "About the eiNetwork: Connecting Knowledge by Linking the Libraries of Allegheny County," Electronic Information Network, Accessed April 9, 2022, http://www.einetwork.net/ein/ein.html. As part of the Electronic Information Network project, a collaborative effort between the Allegheny County Library Association, the Carnegie Library of Pittsburgh, and the Commission on the Future of Libraries in Allegheny County. EIN hosted the original CMP website.

[268] "Photographic Screensaver for Windows," Carnegie Museum of Natural History, captured via Wayback Machine on August 2, 1997, https://web.archive.org/web/19970606045307/http://www.clpgh.org/cmnh/shops/scrsaver.html.

An effect of CMNH's pre-pandemic online strategy was that there had never been a dedicated conversation about producing a web version of the onsite LAE prior to the museum closures.[269] With the majority of other CMNH electronic content, online enactments of the living animal collection were brief snippets on social media, short blog posts about animal care, and introductory videos to certain species available on the CMNH YouTube channel which was more advertisement than standalone content. Essentially, the education and marketing teams crafted promotional teasers using the Living Collection and stills from LAE as a draw for museum visitation as opposed to the creation of a more intentionally educational or experiential online presence.

When the time came to deliberately develop online programming, the decisions about how to remediate the enactment were predominantly made by the Lifelong Learning staff with no direct input from the the marketing team in charge of CMNH's online presence.[270] The marketing team was interested in using short videos and images of cleaning, feeding, and enrichment activities during the closures to keep potential visitors interested by way of behind-the-scenes content, but did not contribute to the remediation of LAE apart from supplying unstable routes to the point of Virtual LAE purchase.

An additional challenge was that the control of the online space was beholden to the marketing team's continuing focus on selling tickets and an indifference toward richer online programming. This meant that the Lifelong Learning staff, even if they intended to create a more robust experience incorporating contextual priming, the marketing team had no interest in pursuing such avenues. There were months of strategies compiled by the American Alliance of Museums

[269] Sperdute, interview with author, January 12, 2021.
[270] Sperdute, interview with author, January 12, 2021.

and the Institute of Museum and Library services including; spreadsheets of website enactments from all types of museums, webinars on keeping audiences engaged through online communication, and best practices on inclusive digital interactives. All providing options for creating and grounding digital programming by the time Virtual LAE began.[271] None of these recommended strategies were implemented during the remediation of LAE, which may have contributed to Virtual LAE falling short of providing the essential contextual priming that constructs the value of LAE.

4.5 Summary

In this chapter, the enactment of animals as museum objects demonstrated an immense storytelling capacity. Their fossilized bones tell us stories of the earth, their corpses tell us stories about their species, and their positioning in reanimated scenes tells us stories of nature. Alongside the explicit scientific and educational stories told through animals in these institutions, the ways these animals have been denaturalized in museums also reveal the stories of humanity, how humans treat the world and how we define ourselves within it. Comprehensive, encyclopedic collecting practices working in tandem with standards of science, technology, and society during the 1800s were foundational in shaping the meaning of lifeless remnants of once living, breathing creatures. And it is within this framing that the effects of living animals enacted through live

[271] "Staying Connected with Your Audiences," American Alliance of Museums, accessed April 9, 2022, https://www.aam-us.org/programs/about-museums/using-digital-platforms-to-remain-connected-to-audiences-during-quarantines; Institute of Museum and Library Services, "Facing Challenge with Resilience: How Museums Are Responding During Covid-19," IMLS Blog (blog), Institute of Museum and Library Services, April 9, 2020. https://www.imls.gov/blog/2020/04/facing-challenge-resilience-how-museums-are-responding-during-covid-19.

programming are brought to bear. Live Animal Encounters at CMNH were created as a byproduct of and a response to the historical understandings and positioning of animals in natural historical constructions of nature. As enacted objects within these frameworks, the animals in LAE are negotiated and brought about by a multitude of factors including their contextualization among artificially constructed displays with dead animals and their denaturalized existence within the walls of the museums. Entrenched in the histories of human-animal relations as displayed by natural history museums, LAE take meaning from their place in the history of natural history museums, their impact relies upon the networks and practices of human-animal relations displayed in every quarter of the museum. The enactment begins long before the audience sits down and continues after the audience leaves the theater and this contextualization was left unaccounted for in LAE's online remediation.

5.0 The Online Exhibition Series at the Carnegie Museum of Art

"… and there's always the question of how to show video."

Joan Jonas, "anything but the theatre"

5.1 Introductory Vignettes

5.1.1 Video Art in Scaife Galleries

You enter an open, airy modern-day art museum gallery with an overview of mostly Anglo art catered to the general public. Predominantly adhering to a white cube aesthetic with nods to gallery display styles throughout the ages, two-dimensional paintings and drawings line the walls in repetitive succession with sculptures and decorative arts sprinkled throughout the gallery. The older the art, the more gilded the area with a relative abundance of thick, gold frames and deep, rich colors painted on the walls. The newer the art, the blander the color palette with subdued hues and increased buffer space between the works with minimal frames if any exist at all. It's quiet. You hear the shuffling of feet, the subsequent creaking of the wooden floors, some hushed conversations, and an occasional security guard warning. As you move closer to what could be considered the corner of the massive gallery space, you can hear some slight mumblings that sound artificial echoing through the area along with the feel of rumbling under your feet.

As you follow the sounds that break up the monotony, you are presented with several displays of time-based media art projecting onto a wall or emanating from a television screen. In

these works, moving images are accompanied by barely audible soundtracks and transformer frequencies that gently bounce off the sparsely covered walls, retreating as they move further away from their source; the mashed-up soundscape alluding to the experimentation that fostered the creation of the works themselves. Though not the longest film or video artworks on the market when compared to, say, Christian Marclay's *Clocks* (2010) that runs a full twenty-four hours requiring the exhibiting institution to stay open for the entirety when on view, the film and video works in CMOA's Scaife galleries require a durational commitment on behalf of the viewer. You would need to spend anywhere from four to nearly forty minutes in the space to view the duration of any single time-based media work on exhibit. The addition of seating near the longer, more involved works quietly instructs you to take your time. You, and most visitors around you, ignore this instruction choosing instead to walk past the works with slight pauses for exposure.

You notice two main areas dedicated to video works alongside the few standalone video works displayed on pedestaled television monitors. One sits in a slightly darkened end of the room partitioned in the middle with a wall that does double duty as the projecting space for the works. The "Artists' Cinema" gallery features a rotating selection of works from the first ten years of CMOA's film and video collection accessions with two rows of couches for extended viewing and a large carpet to help regulate the sounds. The other space is visually sectioned off from the rest of the gallery using walls and curtains though the audio reverberates through the floors and walls of the surrounding galleries. In this black box, lit mostly by the work itself and a faint glow from a tinted window into the main gallery space, Bruce Conner's 1976 collage of "Operation Crossroads" nuclear testing footage runs on a loop with a two-part score composed from synthesizer and organ. The inspiration for the whole exhibition's title "Crossroads: Carnegie Museum of Art's Collection, 1945 to Now," the intention behind Conner's work and its

presentation in this dark, contained space is one of somber meditation with a relentless movement forward even as it forces you to confront the past. You acquiesce to this invitation to be enveloped by the work, to feel it unfold around you. But, of course, you can't sit there all day. You are there to see the museum, after all, not just this one work. You spend a good five minutes of the work's thirty-seven in the space, scan the label copy to situate your understanding of the work, and move on to continue your visit.

5.1.2 Online Exhibition Series

Your pet is moving in the background. You notice a corner of your office that needs to be dusted. You hear a ding from the email that appeared in your inbox. Maybe you are looking for activities to do with your kids during the pandemic, maybe you are a Carnegie Museums member and saw an advertisement, or maybe you are really into video art or one of the artists featured in the series. Whatever brought you here, you are on the Carnegie Museum of Art's website accessing their Online Exhibition Series. You select the current installment and are greeted with a full-width still from the featured video artwork, the complex and not-yet-contextualized "hero" banner image intended to set the tone for the page framed by the standard black, red, and white website header. This header, with the CMOA logo and navigation menu, becomes a fixed feature that joins you in your scrolling journey as a constant reminder of your digital positioning.

Following the now well-trodden patterns of website design, you begin scrolling down to see the title, dates, and location of the exhibition. Scrolling further reveals a standard 3 to 1 layout with the page's main content filling the left two-thirds and a sidebar with related content and more granularly focused navigation on the right. The main content opens with another image. This image has the same aesthetic feel as the banner image, but this one is overlaid by a playbar signaling that

this is not a still image. Instead, this is a thumbnail of a video that has been embedded into this CMOA webpage. Hovering over the buttons reveals the distinctive light blue common to tech companies. As this is not a blue used in any CMOA branding, you can guess that this video is hosted on the Vimeo video hosting and sharing platform (viewing the page source confirms this suspicion). You also notice that the full playbar is visible allowing you to pause, skip around, and scrub through the video timeline. Underneath this video player is text describing the embedded audiovisual work that reads similarly to an extensive interpretive text panel about an object found on the walls of museum galleries. You read through this and a brief artist biography, then scroll some more to find selected stills from the work, an overview of the exhibition series, a snippet about the CMOA film and video collections, and information about funding support for the exhibition with company logos that are conveniently hyperlinked to their homepage. Depending on which work in the series, there is also a description of how this work has been presented before its online exhibition at CMOA, the mention of which leads you to wonder how it might have looked in those settings. Your page view is rounded out by the static CMOA website footer.

You go back up to the video player and press play. You hear some ambient noise, maybe some light music depending on the work you just started, coming from your laptop speakers. You turn up the volume to hear the whole soundtrack only to question if what you're hearing is what you are meant to be hearing. It sounds somewhat tinny and sharp, mostly devoid of bass, like what you would expect from internal computer speakers. You could go grab your expensive headphones, but you don't, convincing yourself, against your better audiophile judgment, that you will get the point without them. You do, however, make sure to briefly "enter full screen" mode on the player, which removes the CMOA branding and other on-screen visual distractions, turning

your decent-resolution monitor, appropriately sized to fit on your at-home desk, into both a determiner of quality and a frame.

Your attention span is limited, however, especially while staring at the same screen that permeates every aspect of your working life and, now that the pandemic is in full swing, your personal connections as well. Your eyes wander to the sidebar as you minimize the video where you notice that the museum has provided some supplementary activities. You click to find activities based on aspects of the work like imagery, concepts, and methods that you can explore from home. You spend the rest of your afternoon drafting your very own rotoscope animation, recording yourself sitting still, or crafting surreal portraits using stuffed animals depending on the corresponding work.

5.2 Introduction

The Carnegie Museum of Art (CMOA) has had a complicated relationship with video art and other time-based media (TBM) over the years that turned yet another corner during the pandemic. CMOA was, at one point, seen as a champion of durational media, with one of the first film programs in the country and one that directly supported the community of experimental film and video makers. In the past couple of decades, however, CMOA leadership had relegated TBM as an inconvenient collecting area that was nevertheless bound to the institution's history, thus, making it undesirable yet inescapable. A combination of the 2020 closures, onsite restrictions imposed by the pandemic, and staff changes in the years right before the pandemic set the stage for TBM to become part of CMOA's strategy for its online "museum from home" initiative.

I begin this chapter by telling the story of video art: how video came to be, its adoption by artists, and the tensions that arose when video and its TBM family found their way into art museums to begin teasing out the characteristics of video art that impacted how and why it gained an unusual acceptance during the 2020 Covid-19 pandemic closures. I then describe video art as enacted onsite and online at CMOA during 2020 to further identify and refine how the affordances and constraints of video are impacted when remediated by online technologies. The sociomaterial qualities described in this chapter show video to be somehow a technologically sophisticated and democratizing method of artistic expression while at the same time being a technically cumbersome and unapproachable, both conceptually and physically, form of art. These tensions may not always play well within the confines of even the most contemporary of gallery spaces depending on the physical constraints and the preferences of leadership and audience, but many aspects of video art enactment appear to be differently palatable when brought online.

5.3 Time-Based Media at CMOA

Just as they were being introduced to the American market, Nam June Paik donned one of the first produced Sony Portapaks in 1965 and recorded *Button Happening*, the first known extant work of video art.[272] In less than two minutes, this Fluxus recording of Paik buttoning and

[272] Paik, Nam June, "Nam June Paik to Porter McCray," October 6, 1965, record group 5, series 16.10, box 759, folder 2, Cultural Council Records, Rockefeller Archive Center, New York, NY. I say extant because Paik reportedly recorded and screened video footage on October 4th or 5th at New York's Café Au Go Go that may have been earlier than Button Happening. Some argue that Andy Warhol had a video camera a few months Paik before but I have yet to find any evidence that this is true. So, too, it might be important to mention that television monitors had already been used by Fluxus artist Wolf Vostell in 1959 and Paik in 1963, but these works did not include original video-- they were using glitches in the process that made television possible.

unbuttoning his jacket on computer tape encapsulated the often contradictory conceptual underpinnings of artists, technologies, and museums, the affordances of technological inventions, and the forced collaborative nature of the post-WWII art world for years to come. In large part, museums "turned their backs on anything temporal" for some time due to the cultural, preservation, and exhibition considerations that will be discussed in forthcoming sections.[273] The Carnegie Museum of Art (CMOA) in Pittsburgh, PA was an exception.

In this section, I lay the foundations for the affordances of video by discussing how artists who were interested in the dematerialization of objects in favor of concepts took advantage of video technologies and the uneasy relationships that formed between time-based media and museums when brought together. I then tell the story of time-based media at CMOA to situate these affordances onsite before moving into the online enactments of video art during the pandemic in the next section.

5.3.1 Video Art in Art Museums

The term "video" is a combination of the Latin *vidēre* (to see) and what is called an "-o-connective," most likely modified after the term "audio" to be its visual counterpart.[274] An offshoot of the "automatic electrochemical recording telegraph," Alexander Bain's 1843 facsimile machine and Giovanni Caselli's more practical version in the 1850s, which scanned, transmitted, and printed images over a distance, video has become a catchall term for electronic audiovisual

[273] Barbara London, *Video Art: The First Fifty Years* (London: Phaidon Press, 2020), 17.
[274] Merriam Webster Dictionary, s.v., "Video," accessed, June 30, 2022, https://www.merriam-webster.com/dictionary/video#learn-more.

recordings to be subsequently played.[275] The earliest published use of the term can be found in the 1934 Proceedings of the Institute of Recording Engineers and was part of the international effort to develop electronic technologies for transmitting, receiving, and rendering visual signals over a distance.[276] The resulting one-to-many video broadcasting technologies quickly folded into public communication strategies through television (literally "to see at a distance") with Germany and England beginning regular electronic television service in 1935 and 1936, respectively, with the United States following in 1939.[277]

Ampex introduced the first "practical" and commercially successful reel to reel video tape recorder in 1956 with smaller, more refined, and portable, consumer-accessible video recording technologies in tow.[278] A large and clunky machine intended for use by broadcasting companies, the Ampex VRX-1000/Mark IV received a standing ovation when first demonstrated at National Association of Radio and Television Broadcasters (NARTB) convention.[279] This acclaim came not from the ease of recording or the clarity from the images presented on the monitor, actually the signal-to-noise ratio produced rather poor image quality, but from the fact that the team used a recorded sequence that was captured of the attendees where they sat at the conference and, with seemingly no more effort than the pressing of a rewind and playback button, immediately played what was just recorded on an average television monitor. The machinery created to accommodate

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[275] Jeff Martin, "The Dawn of Tape: Transmission Device as Preservation Medium," *The Moving Image* 5, no. 1 (2005): 45, https://doi.org/10.1353/MOV.2005.0012; Alexander Bain, Electric Telegraphs, British Patent 11,480, filed 1846. The development of video relied on the line-by-line scanning technique developed by Bain in his facsimile machine.

[276] R. D. Kell, A. V. Bedford, and M. A. Trainer, "An Experimental Television System: Part II-The Transmitter," *Proceedings of the Institute of Radio Engineers* 22, no. 11 (1934), https://doi.org/10.1109/JRPROC.1934.226713.

[277] Charles L. Ponce de Leon, *That's the Way It Is: A History of Television News in America* (Chicago: The University of Chicago Press, 2015).

[278] Charles Ginsburg, *The Birth of Video Recording* (Ampex Corp Redwood City: Ampex, 1981).

[279] Ginsburg, *The Birth of Video Recording*.

recording on video tape like the rotating head, magnetic heads, motion and tension compensation methods, and inverse frequency transformation all also happened to afford the luxury of immediate playback alongside the time-switching capabilities originally sought after.[280] When Sony's "Videocorders" came onto the scene in 1965, their advertising featured both time-switching, which they referred to as transcribing an un-copyrighted television program on tape for later viewing, alongside playing back any tape that was recorded at any time whether a minute or a year ago.[281] Of course, analog videotape recording technologies came with many caveats such as bandwidth challenges and the expense of acquiring the hardware and maintaining it. Nonetheless, the rewritable, multi-track capable, and immediately playable, analog signals recorded on magnetic tape were deemed useful enough to put recording technologies into the hands of consumers in the 1960s.[282]

Foreshadowing the soon-to-be manifestos of the digital age, analog video was quickly adopted by artists in the 1960s as a revolutionary medium with which artists could continue to push back against the oppressive elitism of the art world and be a means of disrupting the power

[280] Charles P. Ginsburg et al. Broad Band Magnetic Tape System and Method, US Patent 524004A, filed July 25, 1955, and issued October 11, 1960.

[281] "Sony CV Series Video," Southwest Museum of Engineering, Communications and Computation, accessed April 9, 2022. https://www.smecc.org/sony_cv_series_video.htm.

[282] Eastman Kodak Company. *Ciné-Kodaks: Kodascopes* (Rochester: Eastman Kodak Company, 1933). Boasting "indoors or outdoors, rain or shine, day or night" capability, the Ciné Kodak Eight film camera had admittedly already established a space for personal visual recording in the consumer environment since 1932 but its cumbersome film maintenance, short recording time per roll, and delayed, often lab-dependent development processes left room for improvement. The Ciné Kodak Eight shot on 25 feet of 16mm film that was split in half to form 50ft of 8mm film. In order to make this work, the filmmaker would have to remove the film roll and flip it. The user also had to thread their own film, protect it from light, spool it, store it, and develop it. The Kodak Super 8 film camera, released in 1965, solved several of these challenges with compact, light-proof film cartridges encased in a lightweight, sturdy camera. However, the extremely limited duration of recording, the time and expense of film development, and the as yet unaccounted recording of synchronized sound continued to drive recording technology toward tape. Kodak did also have a 16mm home movie camera on the market in 1923, but the Ciné Kodak Eight was really where consumers got on board.

structures built on information dissemination.[283] Fueled in part by the fear of nuclear warfare and the rise of consumerism, rapid technological and political changes occurred during the post-war era and the dawn of the space age across the Global North, encouraging the growth of countercultural movement.[284] But just as popular culture encouraged the accumulation of things, aided in large part by the magnified advertising capabilities of radio and television, artists were looking to dismantle *the thing* as an object of value. The natural successor of avant-garde movements in the first half of the 21st century, like Dadaism, Surrealism, Suprematism, Abstract Expressionism and the Fluxus group, conceptual art arose in response to the establishments of modernity including institutionalism, consumerism, and materialism.[285] Conceptual artists of the late 60s and early 70s, specifically 1967-1972 as marked by art critic Lucy Lippard in *Six Years*, located their artwork "at the level of ideas rather than that of objects."[286] Conceptual and minimalist artist Sol LeWitt claimed that with conceptual art, "the idea or concept is the most important aspect of the work," instead of a stable, standalone object.[287] They were interested in art forms that did not necessarily produce a finished object and any *thing* that was created as a by-product was often challenging to commodify.

Video technologies and other time-based media were well-suited to such conceptuality. Though video was also epitomical of the capitalist agenda (i.e., getting as much planned and unplanned obsolescence into the hands of consumers especially under the guise of technological

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[283] Beryl Phyllis and Korot Gerchuny, "Letter to the Readers," *Radical Software*, 1970; London, *Video Art*, 11-12.

[284] Paul Ryan, "A Genealogy of Video," *Leonardo* 21, no. 1 (1988): 43, https://doi.org/10.2307/1578414.

[285] Elisabeth Schellekens, "Conceptual Art," in *Stanford Encyclopedia of Philosophy*. Stanford University, 1997-, Article published June 7, 2007, last modified March 23, 2022, https://plato.stanford.edu/entries/conceptual-art/#ConArtWhaIt.c

[286] Lippard, *Six Years: The Dematerialization of the Art Object from 1966 to 1972* (Los Angeles: University of California Press, 2001).

[287] Sol LeWitt, "Paragraphs on Conceptual Art," *ArtForum*, Vol. 5, no. 10, Summer 1967, 79-83.

innovation) and obviously still produces "things," the production of portable video technologies could occur well outside the confines of institutionalized artistic expectations up to the time and gave an impression of non-physicality in comparison to the painting and sculptures of yore. Personal, portable video systems "represent[ed] the essence of decentralized media: one person now becomes an entire TV studio, capable of producing a powerful statement..." with claims of being "indispensable to the artist."[288]

Along with video's affordances for guerilla creation, the medium also aligned with the performative and exhibitionary needs of conceptual artists. The artists of 1966-1972, explored conceptuality by playing with "thought processes and methods of production" through live-action Happenings, performance pieces, and immersive installation artworks.[289] With its ability to be rewritten and played on a whim, videotape accommodated the instantaneity and spontaneity sought after by some artists. Along with the ability to time-shift that would aid in recording any event for display at a later date, artists could and did exploit the very feature that brought NARTB attendees to tears in 1956 in exhibiting their video works as immediately as they created them. For example, Paik, the artist mentioned in the introduction to this section, put on a self-described "hasty, tentative show of Video Recorder" the same day he acquired the machinery.[290] Contrary to "prevalent mythology" that espouses ubiquity of these events, such unplanned art shows were not as common as the public thought in the art scene but many conceptual artists did take full advantage of what MoMA's first video curator, Barbara London, described as video's quality of

[288] Charles Bensinger, *The Video Guide*, 2d ed (Santa Barbara, CA: Video-Info Publications, 1979) 155; Paik, "Nam June Paik to Porter McCray."

[289] *Tate Art Terms*, s.v., "Conceptual Art," accessed June 30, 2022, https://www.tate.org.uk/art/art-terms/c/conceptual-art.

[290] Paik, "Nam June Paik to Porter McCray."

"being live" in their productions to various effect.[291] Some would forgo the videotape completely, relying instead on the origins of video by connecting video cameras directly to monitors for even more immediacy or use both to simultaneously display numerous time and places. In Bruce Nauman's *Live-Taped Video Corridor* (1970), for instance, he positioned two monitors at the end of a narrow hallway with one connected to a live feed of the corridor and the other to a recording of the same hallway.

Video's dependency on electronic mediation and light-based displays also lent itself to a kind of malleability and imposition that also aligned with conceptual art. Video signals could be fed through any number and organization of monitors allowing flexibility in design choices. One recording could be on 100 screens, dedicated to one, or anything in between meaning that the expression of the work can be manifested differently in any given instantiation. Altering the works to the location, availability of technology, and artist desires without having to alter the videotape itself adds a level of flexibility not possible with works on paper or sculpture. The artists could manipulate the light and shadows from the monitors as an additional medium for shaping the enactment.

Through the 70s and 80s, mechanical components of analog video production were increasingly replaced with digital technologies that supported more customizability and reels were replaced with more compact videocassettes and digital formats, both features also increased portability. These trends toward digitality also eventually ushered in the use of optical discs, hard disk drives, and solid state drive for data storage instead of the laboriously conceived magnetic tape alongside the replacement of CRT monitors with more compact, more customizable digital

[291] Michael Kirby, *Happenings: An Illustrated* Anthology (New York: Dutton, 1965), 9; London, *Video Art*, 14.

video displays like LED, LCD, and Plasma screen and projection devices. While there remain many uses for and development in analog and magnetic tape technologies, digital storage and digital screens, with the additional availability of editing software, has afforded artists even more flexibility, portability, and control in their video creation and exhibition.

The affordances of electronic technologies and durational media that made video so appealing to conceptual artists happened to also make it an uncomfortable medium for the public and the institutions who would eventually be collecting works of video art. Content and concepts of conceptual art have some stake in that uncomfortability, but the distaste for time-based media in museums did not start with conceptual art. Though maybe not an entirely "unbridgeable gulf" as film and art historian Benjamin Ogrodnik reasonably criticizes scholars for often emphasizing, film was the first major TBM hump for museums to get over.[292] When the Museum of Modern Art (MoMA) in New York opened the Film Library in 1935 as the first American institution dedicated "to trac[ing], catalog[ing], assembl[ing], exhibit[ing] and circulat[ing] a library of film programs so that the motion picture may be studied and enjoyed as any other one of the arts is studied and enjoyed," those in both the art world and the general public were skeptical about preserving or viewing films in an art museum; they simply could not see how such "ephemeral entertainment" could also be an "enduring cultural monument."[293] Under the direction of Iris Barry and Alfred Barr, the establishment of MoMA's library was essentially the first institutionally backed argument

[292] Ogrodnik, "Forging an Alternative Cinema: Sally Dixon, the Film Section, and the Museum-Based Media Center," *Film History: An International Journal* 31, no. 2 (2019): 147, https://doi.org/10.2979/FILMHISTORY.31.2.06/0.

[293] Alfred H. Barr, "Chronology of a Few Highlights of the Museum of Modern Art," Museum of Modern Art news release, 1959; Haidee Wasson, *Museum Movies: The Museum of Modern Art and the Birth of Art Cinema* (Berkeley: University of California Press, 2005), 2; Mutual Corp v. Industrial Comm'n of Ohio, No. 236 U.S. 230 (1915). In 1915, the U.S. Supreme Court stated that the "exhibition of moving pictures is a business, pure and simple, originated and conducted for profit like other spectacles, and not to be regarded as part of the press of the country or as organs of public opinion within the meaning of freedom of speech and publication guaranteed by the Constitution of Ohio."

in North America for the value of film as a culturally relevant art form and paved a rough path for the future of time-based media.[294]

Film had both cultural and practical hurdles, many of which carried into museums' relationship with video. Popular film was categorized as either documentation or entertainment and its showing encouraged audiences regarded as those in need of etiquette instruction.[295] Before film was determined to have any long-term value (i.e., been defined as an art form), it was, for all intents and purposes, a "disposable object" that was often thrown out to clear out space for the next spectacle.[296] When Barry began the Film Library, it was estimated that most films created at that point had not survived past a year. The suitability of film in a museum setting was also a challenge practically and exhibitionally. On the practical end, film was and remains notoriously cumbersome to preserve and requires a lot of ongoing maintenance, especially when compared to the relative ease of storing painting or sculpture and making it exhibition ready.[297] So, too, the fact that light and sound, whether intentionally added as a soundtrack or supplied by the characteristic sounds of a projection machine, are inherent aspects of motion picture exhibition means that their physical display characteristics necessitate isolating conditions. For instance, the light of the projection needs darkness, and the sound needs limited interference to be as vibrant as possible (in both experiential and scientific vibrancy). An additional factor was the commitment level on behalf

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[294] Wasson, *Museum Movies*. Cinema had already been brought into museums, but as a technological artifact.

[295] Iris Barry was known for scolding audiences for their rowdy behavior, often shutting down screening if the audience did not behave with appropriate decorum.

[296] Justin McKinney, "From Ephemera to Art: The Birth of Film Preservation and the Museum of Modern Art Film Library." *Art Documentation* 33, no. 2 (2014): 295, 309. https://doi.org/10.1086/678547.

[297] George R. Reis, "Nitric Acid," *Fund Raising Management* 28, no. 2 (1997). Film bases and emulsions require additional environmental considerations to slow down unavoidable deterioration and their screening almost always necessitates duplication and versioning to reduce the harmful effects of wear on the original. Specifically, George R. Reis talks about how nitric acid (formed with nitrate film comes into contact with oxygen) eats the nitrate film and issues like vinegar syndrome are common with acetate. Polyester is a much more stable alternative but was not around till the 50s.

of the audience. The duration of the films required an investment of time and attention that is more flexible with static media.

Because of these factors, film was not simply divided into its own medium-specific department as is standard practice in contemporary art museums. Instead, film was physically and conceptually relegated to its own arena–one that most benefactors and curators were not willing to enter as readily as those of sculpture, painting, and drawings. Some film screening series like those of the National Gallery of Art's Film Program sprung up in the years following MoMA's library, notably as "an additional aid to the appreciation of the still arts," but it would be some time before full departments with collecting agendas would become commonplace.[298] The institution examined in this chapter, the Carnegie Museum of Art, opened their Film and Video Department (then the Film Section) over three decades after MoMA, in 1970, and could still claim itself as "one of the first museum-based film departments in the country."[299]

It was around this time that video and its family of time-based media became impossible to overlook for those in the art world, but it was seen as even more of an interloper than film when it came onto the scene.[300] Used in conceptual art movements that were explicitly hostile to the marketplace, video art was often intentionally challenging to interpret, collect, and display. Though a significantly different medium in terms of its technologies and methods of production, film departments of the 70s took video under their wing as part of a loose grouping of noisy, unstable objects that required some type of technological aid to make them exhibition ready. When

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[298] National Gallery of Art. "Press Release on Film Program." National Gallery of Art press release, 1942. https://www.nga.gov/content/dam/ngaweb/research/gallery-archives/PressReleases/1949-1940/1942/14A11_43548_19420815.pdf.

[299] Kate Barbera, "Finding Aid for the Department of Film and Video Archive," Department of Film and Video Archive, Carnegie Museum of Art, accessed June 30, 2022. https://records.cmoa.org/finding-aids/film-video.

[300] "Buying Time," in *I Have a Friend Who Knows Someone Who Bought a Video, Once: On Collecting Video Art*, ed. Carolina Ciuti and LOOP Barcelona (Barcelona: Mousse Publishing, 2016), 11.

video was coaxed into museums by the likes of London, its "questionable" stature as a medium worthy of museum collection became one of detestation when exhibition was on the table.[301]

In contrast to film works of the time that could be isolated into theaters or restricted to screening events, even if they were not intended to be so, video works necessarily infiltrated and marred the pristine "white cube" rooms of the contemporary art gallery.[302] The physical footprint of their monitors and projection devices could maybe have been accepted as appropriately sculptural but their electronic impositions of sound and light were blasphemous to the sanctity of the sterile space. Additionally, these works required more audience attention than many were willing to give in an average tour of the gallery. As opposed to the static installation of traditional art media where a visitor could glance at a work then move on at their pace, video art asked the visitor to become an audience member with attendant participation.

As technology changed through the 80s and 90s, video art and experimental film broke away from the more narrative cinematic motion pictures held to esteem by film buffs and into explorations of digital and networked environments under the umbrella of time-based media art. Still sometimes lumped together with film-focused departments, TBM is now a generally accepted term that encompasses any art form reliant on duration as a dimension and utilizes visual and audio production technology like film, video, slides, audio, and computational devices for production and display, or, in other words, technology-enabled art that has a temporal dimension.[303]

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[301] London, "Buying Time," 11.

[302] Brian O'Doherty, *Inside the White Cube: The Ideology of the Gallery Space* (Berkeley: University of California Press, 2010.) "White cube" was coined by artist and art critic Brian O'Doherty in 1976.

[303] *Tate Art Terms*, s.v., "Time-Based Media," accessed June 30, 2022, https://www.tate.org.uk/art/art-terms/t/time-based-media.

5.3.2 Contemporaneity in the Rust Belt as CMOA's TBM Foundations

CMOA's industrially adjacent and regionally provincial positioning created tension when upholding ideals of contemporaneity in the light of Modernism and bringing the world to Pittsburgh while simultaneously clinging to conservative aesthetics and particularly European versions of the world. In practically the same breath, Carnegie and his advisors could extoll the collection and exhibition of contemporary artists, so-called "Old Masters of tomorrow," while paternalistically banning nudity to avoid offending "ordinary" Pittsburghers.[304] This tension proved to be productive, however, in establishing uneasy alliances between directorial proponents of modernism and their conservative audiences that contributed to CMOA's ability to toe the line as a contemporary art museum in the middle of industrial America.

Upholding a reputation for conservative collection practices through the first half of the twentieth century, museum directors established some trust with the region while occasionally prodding at that comfort with more modernist aesthetics and concepts. Director Homer Saint-Gaudens (director between 1922-50), for example, was known for favoring academic art in the collection, believing that "aesthetics should be divorced and remain divorced from all the turmoil of the rest of the world," all the while making sure that the *Carnegie International* exhibition had "regular, well-designed forays into daring contemporary art" often exceeding the quotas of "wild" art desired by the exhibition's committee.[305] In response to public outcry after works like Franklin Watkins' painting of a crumpled clown corpse on a table with a smoking gun titled *Suicide in*

[304] Gangewere, *Palace of Culture*, 132.

[305] Gangewere, *Palace of Culture*, 142; Susan Platt, "Gambling, Fencing and Camouflage: Homer Saint-Gaudens and the Carnegie International 1922-1950," in *International Encounters: The Carnegie International and Contemporary Art, 1896-1996*, ed. Vicky A. Clark (Pittsburgh, PA: Carnegie Museum of Art, 1996), 66.

Costume and Peter Blume's surrealist *South of Scranton*, both of which won top prize at the International in 1931 and 1934 (respectively), Saint-Gaudens stood by his selections for the show stating that the exhibition was "the laboratory wherein was touched off the fuse that exploded the charge that within the last two decades blew up the illusions of self-contented ignorance."[306]

This tension was tested further during the so-called deindustrialization Renaissance in post-war Pittsburgh (1946-1973) when collecting, not just exhibiting modern contemporary art became an agenda item under the leadership of museum's director Gordon Washburn (director between 1950-62). Washburn's tenure planted the seeds for time-based media at CMOA via his argument for the capacities of modern artists and the value of modern art as an emancipatory act: "Modern art, like modern science is largely concerned with truths that are not outwardly visible… No longer guided by the conventions of his immediate time and place, our contemporary artist feels at liberty to make his creations out of any material whatsoever and even to mix together the traditional categories… It is, as we may see, a veritable artistic emancipation."[307] Along with his advocational efforts in the name of modern contemporary art, Washburn established the Women's Committee, which ended up being a major contributor to conceptual and experimental art forms and entry point of the future Film Section's founder, and he brought on Leon Arkus (director between 1968-80) who became a formative contemporary museum director in Washburn's modernist wake.

[306] Vicky A. Clark, "The Politics of Art: Artists Tackle Life's Biggest Issues with Their Work," *Carnegie Magazine*, Novermber/December 2004, https://carnegiemuseums.org/magazine-archive/2004/novdec/feature4.html.

[307] Gordon Bailey Washburn, "Popular Questions and Unpopular Answers on Modern Art," *Carnegie Magazine*, November 1962, 302.

5.3.3 The Department of Film and Video

In 1970, Sally Dixon (curator between 1970-1975), along with Washburn's protégé Arkus, founded the Film Section at CMOA with financial support from the Women's Committee, Richard Scaife, and the Allegheny Foundation.[308] The section was one of the first of many new film programs spawned that decade and originally started as a three-year program to support the burgeoning experimental film community in Pittsburgh and the larger international community as well, with many crediting Dixon as a major force in experimental film's legitimization across the art world.[309] The Film Section held screenings, hosted independent filmmakers, and provided access to filmmaking equipment to local artists all outside the rigid confines of standard institutional financial structure.[310] The section paid artists relatively large sums for their time and began publishing resources like the "Film and Video Maker Travel Sheet," a monthly directory of artists and venues to help programmers and curators "more fully utilize film and video maker tours."[311] Multimedia artist Carolee Schneemann described the travel sheet as an "integral channel of communication and confirmation" among "marginalized independents." [312]

When Dixon left CMOA in 1975 to pursue other arts administration positions, the reins were handed to her assistant William "Bill" Judson (1975-2003) who immediately shifted the

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[308] Gangewere, *Palace of Culture*, 165.

[309] Barbera, "Department of Film and Video Archive"; Ogrodnik, "Forging an Alternative Cinema," 146.

[310] Barbera, "Department of Film and Video Archive."; Carnegie Museum of Art, "A Collection of Misfits Symposium 2013: Bill Judson," Filmed November 22, 2013, Vimeo video, February 12, 2016, 10:41, https://vimeo.com/155122415.

[311] "Film and Video Makers Travel Sheet," 1975, Department of Film and Video Archive, Carnegie Institute, Carnegie Museum of Art, Pittsburgh, PA.

[312] Carolee Schneeman, "Letter from Carolee Schneemann to Bill Judson, 03/29/1987," 1987, Department of Film and Video Archive, fv001/001/003/001/B014/F09/001, Carnegie Museum of Art, Pittsburgh, PA https://records.cmoa.org/things/3cb087fc-60c9-48fd-a98e-d7f6c2004d89.

department toward video art.[313] As mentioned previously, the technical characteristics of these media were quite different from one another, but their durational and technological dependencies allowed for the two to fall under the same umbrella along with any other time-based media. Judson once stated, "if it moves, it's mine," claiming even performance art under his department's purview.[314] His eagerness to collect video art was stalled until 1980 due to both a stipulation that new accessions had to be at least five years old before bringing them into the building and exhibition was on hold because the museum did not actually own any video equipment during the 1970s. Video artists exhibiting with CMOA would have to screen their work at partnering organizations, for example, Jordan Belson and Stephen Beck at Pittsburgh Filmmakers in 1974 or Amy Greenfield at the University of Pittsburgh's Hillman Library in 1979.[315]

When video equipment was made available onsite, Judson fought for a normalization of video art. Gone were the days of the video being seen as an experimental, disjointed medium that everyone kept claiming to not understand, and in was the notion that time-based media works had conceptual, formal, and chronological trajectories just like any other medium.[316] To show this, Judson and his team would curate whole exhibits around themes with subjects well-trodden in traditional media. In *American Landscape Video: The Electronic Grove* (1988), for instance, the seven selected video works all dealt with the natural landscape as their subject matter, whereby the works "exemplif[ied] an emphatically contemporary medium" while "also continu[ing] a major tradition of American art in addressing themes that arise from nature."[317] Judson also intentionally

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[313] Tess Takahashi, "Uncovering the Secret History of Video Art at the Carnegie," *Storyboard*, January 26, 2018, https://storyboard.cmoa.org/2018/01/uncovering-the-secret-history-of-video-art-at-the-carnegie.

[314] William Judson, "Performance Art at the Carnegie," *Carnegie Magazine*, September/October 1986, 26.

[315] "Conversation with Stephen Beck, Robert Haller, and Sally Dixon," January 1, 1974, Department of Film and Video Archive, fv001/002/035/C, Carnegie Museum of Art, Pittsburgh, PA.

[316] Ogrodnik, "Forging an Alternative Cinema," 159.

[317] William Judson, *American Landscape Video: The Electronic* Grove (Pittsburgh: Carnegie Museum of Art, 1988).

sought to advance video art within the museum by treating it like traditional art forms that deserved their place in the museum proper–a timely possibility with the addition of the Sarah Mellon Scaife galleries that tripled the museum's exhibition footprint in 1974 and the support of Jack Lane (1980-1987) who, when he became director, ousted every curator except for Judson, who also believed in the importance of "cutting-edge art" like video and experimental film.[318] With the additional space, more contemporary art in general could be displayed and video art was allotted a whole space to itself, but, unlike the isolated theaters of yore, video was incorporated into the normal gallery spaces and played on a loop to function similarly to more stable artworks. Judson wrote in 1985, "The Video Gallery shares space with the exhibition of the permanent collection of modern painting, thereby reinforcing the museum's position that video is an integral aspect of contemporary art."[319]

Video and film did, however, pose many technical challenges both in the gallery space and behind the scenes that other media did not including the requirement of manual maintenance to ensure continuous looping, preservational challenges especially as new formats continued to come on the market, and issues of value with a medium that could much more readily be copied and distributed. To the shock and dismay of Judson and those in the time-based media community, these resource-intensive factors along with low attendance at events resulted in the dissolution of the Film Program and the subsumption of the Department of Film and Video into the Department of Contemporary Art during the Carnegie Institute's financial woes in the early 2000s.[320] Speaking

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[318] Takahashi, "Video Art at the Carnegie."; Gangewere, *Palace of Culture*, 166.

[319] William Judson, "Video Gallery for Single-Channel Works," 1974, Department of Film and Video Archive. fv001/001/007, Box B004, Carnegie Museum of Art, Pittsburgh, PA.

[320] Dante Ciampaglia, "Carnegie Drops Film Program," *The Pitt News*, January 16, 2003, https://pittnews.com/article/38369/archives/carnegie-drops-film-program; Patricia Lowry and Caroline Abels, "Carnegie Film and Video Cuts Leave Many Reeling," *Pittsburgh Post-Gazette*, January 18, 2003, http://old.post-gazette.com/ae/20030118carnegie0118fnp2.asp.

to the Post-Gazette in 2003, Carnegie Institute President Ellsworth Brown said the department "was not the most integral to [the museum's] mission among [its] other unique programs and collections. The museum's mission is to collect exceptional works of art and present them for the enjoyment and enlightenment of all."[321] It was the only department fully eliminated from the museum during the cuts and many in Pittsburgh thought the decision ignored the department's integral part in shaping the experimental film and video international landscape and provided a unique opportunity for such work in the middle of the country. The Pittsburgh City Paper poked fun at the absurdity of the decision in their 2004 predictions stating:

> In a sequel to last January's widely condemned decision to eliminate its film and video department, the Carnegie Museum of Art announces that, to save money, all formerly nude statues will now be clothed. 'Doing laundry is cheaper than dusting, which is highly labor intensive,' explains Carnegie Institute President Ellsworth Brown. And sculptural nudity is 'not central to the museum's mission.' Museum insiders add that the statues may be dressed in new outfits as fashions change.[322]

Carnegie leadership assured everyone that film and video would continue under the direction of the Contemporary Art Department even as some of the collection was transferred to the Andy Warhol Museum, for reasons that will be discussed in the next chapter of this study, and their once active records were moved into the archives.

Since then, activity around time-based media at CMOA has been mostly in the archives and collections management arenas. In 2011, the museum was awarded an A. W. Mellon grant for New Director's Initiatives, which included the Time-Based Media Project "to preserve, and make

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[321] Lowry and Abels, " Cuts Leave Many Reeling."

[322] CP Staff, "The Predictions Issue," *Pittsburgh City Paper*, January 1 2004, https://www.pghcitypaper.com/pittsburgh/the-predictions-issue/Content?oid=1335935.

accessible, its time-based media collection holdings and related archival materials" that received continued support in 2013.[323] A robust project that included inventorying, documentation protocol development, digitization and migration of especially unique holdings, digitization of archival materials, and bringing time-based media practitioners and scholars together for an international symposium on the challenges of working with TBM in a museum setting.[324] Though a significant project, the focused attention to these media in recent decades was an anomaly. During the Time-Based Media project's 2013 *A Collection of Misfits: Time-Based Media and the Museum* symposium, Phillip Leers, the Senior Research Associate for the Time-Based Media Project stated in response to a question about the future of TBM at CMOA:

> Well, to act very aware, obviously, of the museum's direction with regards to time-based media and working with knowledge that after this grant is up in three years or so, that we're going to go back to the way things had been going before that–For me, what's important is making sure that the collection is accounted for, is stored correctly, and… to make sure that we have done as much outreach, awareness-building, community-building around the collection as possible, and then, at the same time to raise awareness among staff… to make sure they are aware of the specific challenges and the specific delights of film and video...[325]

In other words, he knew that TBM was at risk of relegation at CMOA. During the same panel, former curator Bill Judson "facetiously" suggested that maybe the museum, "shouldn't be

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[323] Kate Barbera, Emily Davis, and Amanda Donnan, "Program Notes: Stewarding Media Artworks into the Futur," *Storyboard*, October 1, 2014, https://storyboard.cmoa.org/2014/10/program-notes-stewarding-media-artworks-into-the-future.

[324] "A Collection of Misfits: Time-Based Media and the Museum," Carnegie Museum of Art, captured via Wayback Machine on January 17, 2014, https://web.archive.org/web/20140117004630/http://www.cmoa.org/misfits.

[325] Carnegie Museum of Art, "A Collection of Misfits Symposium 2013: Panel 2," Filmed November 2013, Vimeo video, February 12, 2016, 18:35, https://vimeo.com/155124324.

involved [with the future of TBM] anyway."[326] As of 2021, the project team has been proven correct in their assumptions. The fruits of their labor have been mostly preserved, though the documentation surrounding the project itself has become scattered and detached from the project itself as little of their work points back to the project and the online project hub no longer exists.

5.4 Affordances Across Video Enactments

Since 2003, the exhibition of video art at CMOA on gallery floors has not been particularly remarkable in any direction. It is neither nonexistent nor foregrounded in ongoing exhibitions, but it does exist in more permanent installations and is occasionally brought in as part of temporary installations and during the Carnegie International. With the reinstallation of CMOA's modern and contemporary art galleries in 2018, a visitor can now regularly see video and film-transferred-to-video works in *Crossroads: Carnegie Museum of Art's Collection, 1945 to Now* located in the same Scaife galleries that Judson looped video in the 1980s. The curatorial staff uses three main exhibition styles in this space: black box projection with theater-style surround-sound, open gallery projection with directional sound, and pedestalled CRT monitors with in-cabinet speakers that sound mono even if stereo.[327] All of which are digital video exhibition copies of either native video work or video transferred from film to allow for automated looping and minimized manual requirements on behalf of staff. Each of these standardized presentational contexts displays how time-based media are products of the sociomaterial affordances that have led to their creation and

[326] Carnegie Museum of Art, "Misfits: Panel 2."
[327] Hannah Turpin, interview with author, January 14, 2021.

are epitomical, though not necessarily exceptional, representations of the relationships between video art, mediation technology, and museum practices.

In this section, I describe how video has been recently enacted at CMOA and extract some of the material challenges of enacting video art onsite. I then detail CMOA's impetus for and approach to creating the Online Exhibition Series featuring video art before distilling the affordances transferred, gained, or lost during remediation.

5.4.1 Onsite Video Enactments

Bruce Conner's CROSSROADS (1976) is enacted as a large, wall-size projection accompanied by a booming synthesized soundtrack created by Patrick Gleeson and Terry Riley (Figure 6).[328] Considered Conner's masterpiece, the 36 minute film is an intense reworking of archival footage from the 1946 Bikini Atoll atomic-bomb test at which "half the world's supply of film" was on deck for recording the event.[329] As the foreword to the official 1946 pictorial record describes, "No man really saw what happened at Bikini… Yet the Bikini tests were fully observed" via 10,000 instruments to record "what the human eye could never see."[330] 50,000 stills and 1,500,000 feet of motion picture film ended up being used to document explosions that took less than a few minutes in realtime.[331] Conner manipulates the multitudes of angles, distances, and film

[328] Rudolf Frieling and Gary Garrels, eds., *Bruce Conner: It's All True* (San Francisco: San Francisco Museum of Modern Art 2016), 13. Conner preferred that the titles of his works be printed in capitals, not italics, and with no other punctuation "like objects in themselves. ... They have an architectural structure. Similar to newspaper headlines, true titles, imperative or directive phrasing, such as HELP, STOP, FREE, TAKE ONE."

[329] Josh Siegel, "CROSSROADS," Bruce Conner, Accessed June 30, 2022. http://michelle-silva.squarespace.com/crossroads.

[330] United States Joint Task Force One, *Operation Crossroads, The Official Pictorial Record* (New York: Wise & Co., Publishers, 1946), 7, https://archive.org/details/operationcrossro00unit/page/n1/mode/2up.

[331] United States Joint Task Force One, *Operation Crossroads* , 9.

qualities to extend the time of the event and repeats portions of time from different views through simple film slicing techniques, entering (or forcing) the viewer into an excruciating, yet compelling engagement with destructive forces.[332] The footage was shot on a variety of films and high speed cameras placed in towers or on planes, the most productive of which were barricaded behind lead-walled vaults with automatic doors that shut after exposure for gamma radiation protection.[333] Once declassified, the National Archives had 35mm and 16mm versions of the film, which were ready to be photochemically copied and spliced upon receipt. Conner pieced the work together, with all that that work entailed, then the film became subject to the host of preservation and display considerations attached to film. The original had to be copied for preservation purposes, eventually restored in 2015 by the UCLA Film & Television Archive, and, finally, reformatted to video to allow for constant looping with minimal wear degradation in CMOA's galleries. Because film technologies existed, the unseeable could be seen; Because film is a time-based media with manipulable qualities, Conner could reinvent the scientific footage as artistic film for a different type of viewing experience; Because it is film, it required several hands with various expertise to create and exhibit the resulting product.

The exhibition of CROSSROADS exemplifies the museum desire to control the inseparable pesky wave emissions of light and sound while simultaneously attempting to provide pristine conditions that support ultimate vibrancy of those emissions. In the black box gallery, the velvet-ed black walls absorb the light waves that would otherwise bleed on other surfaces if left unchecked and, in turn, the darkness allows the projection to be bright and clear. No other work is

[332] Adrian Searle, ""Horribly Compelling: Bruce Conner's Nuclear Test Film Still Holds Us in Rapture," *The Guardian*, June 15, 2015, https://www.theguardian.com/artanddesign/2015/jun/15/bruce-conner-crossroads-1976-nuclear-test-film-rapture.

[333] United States Joint Task Force One, *Operation Crossroads*, 29.

imposed upon by the video and the video is not subjected to unplanned, unmitigated light. The sound, on the other hand, is more challenging to restrain. The soundwaves not only escape the confines of the box through the air in the spaces near the work, they also rumble through the floor of the gallery reaching several hundred feet. One gallery attendant mentioned that gallery staff are often asked if there is a train nearby because visitors cannot figure out that the rumbling is coming from a work in the gallery.

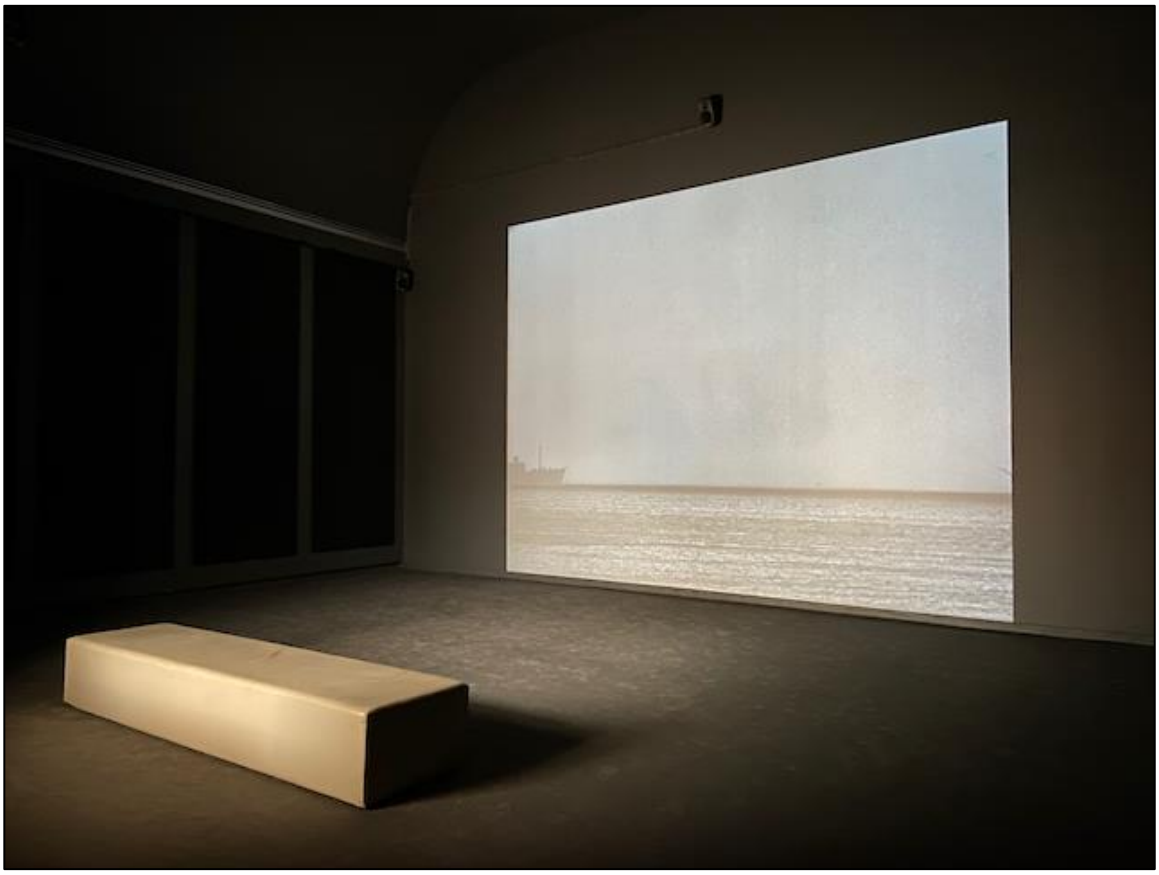

Figure 6 Gallery installation of Bruce Conner's CROSSROADS (1976).

Figure 7 Gallery view of Tony Cokes, *Black Celebration* (1988).

Figure 8 Gallery view of Peter Campus, *Three Transitions* (1973).

The other video works in the gallery impose similar challenges with various styles of tempering from the curatorial and installation teams. Both pedestalled works that were on display in 2020-2021 were positioned where their visual outputs would not interfere with surrounding art. The lighting in these spaces was not optimal for video light waves; the traditional overhead lighting of the white cube interfering with the light waves coming from the TV monitors, washing out and dulling the rendered image. These visual conditions display competing interests with bulky CRT monitors on large pedestals alluding to the sculptural, thus more readily understandable qualities of video work, which seems to be the forms of the hardware that mediates it rather than its content, while the open, well-lit gallery consumes any escaping light from the electronics.

In consideration of the sound output, the museum elected to compromise the audible soundtracks of the pedestalled video works to maintain the sanctity of the gallery space instead of enacting the works as intended. In an egregious case, the display of *Black Celebration* (1988) by Tony Cokes, the staff decided to lower the audio on the work to an almost imperceptible hum in what appears to be an attempt to maintain the white cube status quo (Figure 7). In actuality, Cokes's video that mixes footage of the 1960s uprisings in Black American neighborhoods with scrolling quotes that provide a commentary on the social and economic conditions that construct race is accompanied by music from Skinny Puppy, one of industrial music's founding bands. Stemming from the bruitism a la *The Art of Noises* manifesto of the Futurists, industrial music uses sound in the "information war against authority."[334] It has been described by music critics as both

[334] S. Alexander Reed, *Assimilate: A Critical History of Industrial* Music (New York: Oxford University Press, 2013), 5.

"not exactly easy listening" and "the most content-heavy and intent-heavy form of music ever."[335] Cokes's selection of industrial music was not only intentional sonically, but conceptually, too.

Regarding sound in his work, Cokes said, "But I also want to deploy sound as a way of opening up other reference systems. There's a desire in my work to make matters more complex and less located in the specific contemporary moment."[336] By silencing this facet of the enactment, CMOA hushed the voice of a black artist and the intentionally chaotic sounds of a video to avoid distressing their visitor base. The other pedestalled work, Peter Campus's *Three Transitions* (1973), has a less abrasive soundtrack that sounds like someone is moving boxes in the corner. Apparently acceptable as ambient noise, Campus' soundtrack has been allowed to gently permeate the gallery.

In what feels like video's persistent defiance, the CRT TVs selected by the staff for displaying these works may be the most prominent contributor to the gallery's cacophony. The selection of TV monitors appears to be more of an aesthetic display choice on behalf of the museum staff instead of an attempt at historical accuracy. *Three Transitions*, for example, was created in 1973 but the TV used in the gallery is from the 1990s.[337] In any case, these choices incur the sonic output of a constant, high-pitched noise from the mechanical and electronic processes happening inside the monitor housing.

The Artists Cinema area has practically no sound whatsoever from either the projection machine or the works on display (Figure 9). This area screens a rotation of digitized films from

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[335] Simon Reynolds, "Blowing Other People's Trumpets Aka 2005's Bumper Book Crop," *Blissblog* (blog), April 9, 2005, http://blissout.blogspot.com/2005/06.

[336] William S. Smith, "Imaginative Resources," *Art in America*, April 22, 2021, https://www.artnews.com/art-in-america/interviews/imaginative-resources-tony-cokes-interview-1234590582.

[337] San Francisco Museum of Art, "Peter Campus on His Most Famous Work and Why He Hates It," filmed July 2014, YouTube video, 3:20, https://youtu.be/aVozAnBiZrg.The work was originally intended to be commercial bumpers for a broadcasting station, so it can be assumed that the artist expected the work to be displayed on a variety of devices.

the early collecting days of the Department of Film and Video along with later videos. For the most part, the quotidian enactment choices, which include a large, flat projection accompanied by two rows of couches for extended viewing in a slightly dimmed end of the long gallery space, operate as a blank canvas for any standard single-channel display. The lighting has been lowered slightly compared to the surrounding galleries and the addition of parametric speakers allows for focused audio play providing more of a dedicated theater feel, but the overall display is diluted similarly to the pedestalled works. The projected images are dim and dull, the sound is so low that spoken word sounds like murmurs through a wall, the full manifestation suppressed.

Judson's dream of TBM on exhibit in the same galleries as paintings and sculpture has lived on, but these enactments of video beg the question of what happens to the expression when its manifestation has been diluted, and in some cases, completely distorted. It would be almost impossible to manipulate a work on paper or carved into marble, unless created to do so, in the same manner that video has been when enacted onsite at CMOA. The intentionality behind displaying these works in gallery spaces to expose typical museum goers to TBM and elevate TBM to be on even footing with art forms considered more traditional seems reasonable and the arguments behind doing so are sound. However, the onsite enactments at CMOA expose the challenges of accepting the full materiality of electronically displayed media in the physical confines of an art museum and suggest that looking at alternative, more digitally dedicated form of representation could be especially fruitful if attempting to account for affordances available when enacting video art.

Figure 9 Artist's Cinema.

5.4.2 Online Exhibition Series

When the Covid-19 pandemic forced museum closures in 2020, Eric Crosby (director beginning 2020-present) and the contemporary art curatorial staff had already begun conversations about how to "better amplify" the film and video collection by the time of the Covid-19 pandemic closures.[338] Crosby led the team that decided upon the three different styles of video display in 2018's *Crossroads* galleries when he was in the senior curatorial position but they knew that more could be done to make these works accessible both physically and intellectually. However, doing

[338] Turpin, interview with author, January 14, 2021.

an online series was not originally part of the plan. Self-admittedly, CMOA did not have a particularly strong online presence or development initiative prior to the Covid-19 pandemic. Like with the Live Animal Encounter at the Carnegie Museum of Natural History, it took the cultural heritage industry shutting its doors to make the internet an appealing option for exhibition and for CMOA to allow "local and global audiences to experience time-based media works previously only accessible in person."[339]

The website itself was and continues to be at the time of this writing, geared toward attracting audiences to the museum building itself instead of engaging audiences online with a heavy focus on upcoming events and current onsite exhibitions. CMOA's initial online public response to the Covid-19 pandemic closure, CMOA From Home, was decidedly a marketing campaign meant to fill the social media gap and began a month into the closures, with the museum realizing that the pandemic was not going away as quickly as they had hoped. The CMOA From Home "agenda" included themed daily content and activities like Monday Motivation, Tour Tuesday, Artist Wednesday, Throwback Thursday, Favorite Friday, Storyboard Saturday, and Self-Care Sunday.[340] However, the contemporary art team wanted something more engaging in similar ways to an exhibition, not a social media post, with Crosby believing that "there should be countless opportunities for our digital audiences to experience and interpret art."[341] CMOA's claim that this series "revolutionized how visitors engage with its significant holdings at a time when

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[339] Carnegie Museum of Art, "Carnegie Museum of Art Launches New Exhibition Series Dedicated to the Museum's Film & Video Collection with Rachel Rose: Lake Valley on May 20," news release, 2020, https://press.cmoa.org/2020/05/20/carnegie-museum-of-art-launches-new-exhibition-series-dedicated-to-the-museums-film-video-collection-with-rachel-rose-lake-valley-on-may-20.

[340] "CMOA From Home," Carnegie Museum of Art, accessed September 5, 2020, https://cmoa.org/from-home.

[341] Taia Pandolfi, "Carnegie Museum of Art Launches New Exhibition Series Dedicated to the Museum's Film & Video Collection with Rachel Rose: Lake Valley on May 20," Carnegie Museum of Art press release, May 20, 2020, https://press.cmoa.org/2020/05/20/carnegie-museum-of-art-launches-new-exhibition-series-dedicated-to-the-museums-film-video-collection-with-rachel-rose-lake-valley-on-may-20.

many cultural institutions were closed due to the coronavirus pandemic" is an unduly grandiose claim considering how common online video screenings have become, but the online series was a first of its kind at CMOA for both TBM and the institution's "digital sphere."[342]

The quick turnaround time for each exhibition, with a runtime of two-months and sometimes less than a month of lead time, demanded that the curatorial team make fairly seamless selections for exhibition in an online environment on top of subject matter considerations. The sociomaterial affordances of the TBM, video specifically, touched upon throughout their technological and social history made the collection selection a "no brainer."[343] Specifically, the curatorial team mentioned that the works were relatively "flat" in the sense that their native rendering exists on a flat plane and that their file formatting was conducive to uploading online.[344] A loosely alluded renaissance of the film and video collection, the curatorial team behind the online exhibition team intentionally selected works that balanced hearkening back to the rich history of works in CMOA's collection alongside those that pointed toward where the TBM collections are headed and works that seemed "translatable to a domestic space."[345] Rachel Rose's *Lake Valley* (2016) and Doug Aitken's *migration (empire)* (2008) were both acquired after their exhibition in the Carnegie International, the former a storybook aesthetic selected to help folks feel "inspired and find solace and comfort during [the pandemic]" and the latter an exploration of human impact on the natural world, were selected as "fan favorites" with recognizable names, approachable aesthetics, and universal subject matter.[346] Diane Severin Nguyen's *Tyrant Star* (2019) and

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[342] Max Edelstein, "Carnegie Museum of Art Announces Cauleen Smith: Pandemic Diaries," Carnegie Museum of Art press release, September 7, 2021, https://press.cmoa.org/2021/09/07/carnegie-museum-of-art-announces-cauleen-smith-pandemic-diaries.

[343] Turpin, interview with author, January 14, 2021.

[344] Turpin, interview with author, January 14, 2021.

[345] Turpin, interview with author, January 14, 2021.

[346] Pandolfi, "Rachel Rose: Lake Valley."

Cauleen Smith's *Pandemic Diaries* (2021), on the other hand, were newly acquired with their exhibition in the series in mind and both touch upon isolation, trauma, and inequity with aesthetics that make a more "contemporary jump."[347]

The actual enactment of these works in the Online Exhibition Series have a few intermingling elements that make the performance possible from the user's perspective, which means at the website interface level where the user, both staff and visitors, interact with the objects enacted and their mediations. As mentioned in the literature review, website design is a little different than traditional GUI (graphical user interface) design in that those crafting the web experience cannot control every aspect of the design because it is dependent upon the end-user's software and hardware set-up. In the case of the Online Exhibition Series, the staff made the decision to plug the enactments into designs and platforms that were already being used by the museum, so the only actual control over interfacial decisions was how to layout the content sections within the main content column of each enactment's page. The layout of each was standardized as follows: a hero image followed by exhibit information, then an embedded video, hosted by the online video platform Vimeo, with information about the work and artist, stills from the video, and text about the exhibition series and support partners cascaded below (Figure 10). Using the main CMOA website as the home base with no exhibition-specific design features, the enacted video art is aesthetically situated like any other video you would find embedded in a blog or website.

Using a software-as-a-service video platform like Vimeo, the museum team opted for the basic features included with that software without much customization or styling. These include

[347] Turpin, interview with author, January 14, 2021.

an overlaid user control bar with now standard options like play/pause, scrubbing, resolution selection, and the ability to expand the video to full screen. Unlike the onsite enactments of video works where the screen size and resolution are determined during installation and the duration of the works is unstoppable and looped, viewers have a bit more control with how and when they view these video works. Features that have been removed by CMOA staff are those that are legally obliged for copyright concerns such as being able to access the works directly from its hosted location or being able to download the video.

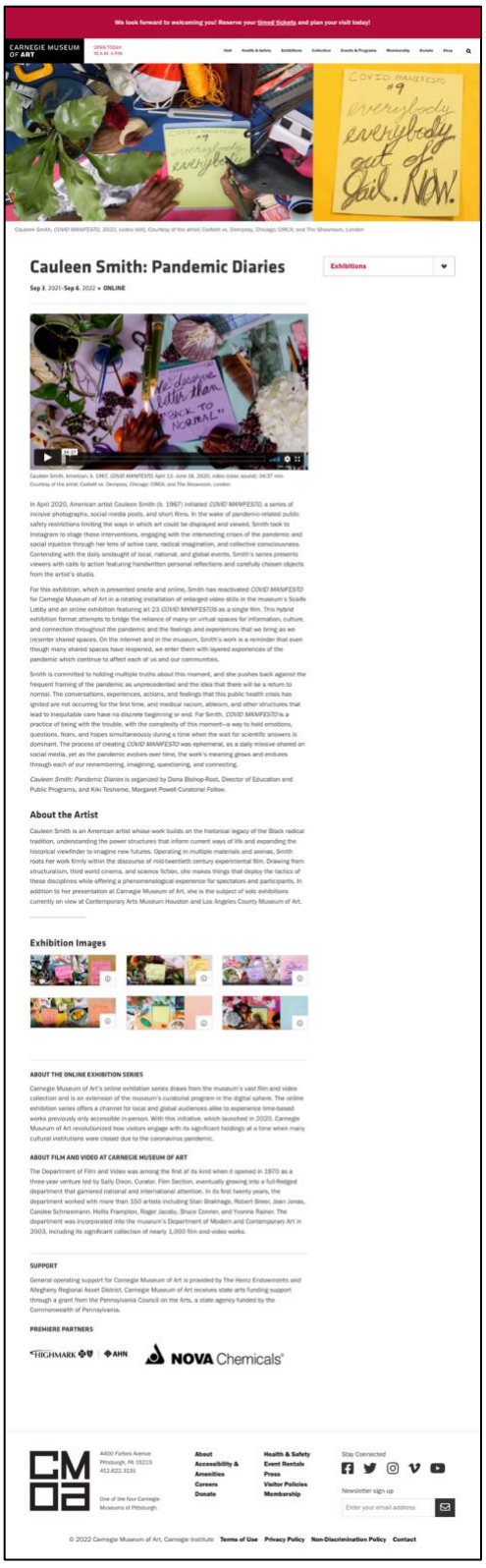

Figure 10 Screenshot of Online Exhibition Series web page.

5.4.3 Affordance Identification

In her medium-defining article that developed a conceptual framework for understanding authenticity and identity in TBM, Tate's Head of Collection Care Research, Pip Laurenson, outlined the features of TBM that should be considered when working with TBM. Many of these same features align with the affordances of digital video when "installed" in an online environment as discussed by CMOA staff.[348] The first of which draws from philosopher Nelson Goodman's identity distinctions of art forms as either autographic, which means that a work is immediately accessible to the viewer, and allographic, which refers to works that must be performed.[349] Unlike more stable art forms like painting or sculpture, the substantial properties of a TBM enactment are only present when that TBM is performed. Their data exists somewhere in enough of a constant state to make the work renderable when called upon, waiting in machine-readable repose using magnetic coating on plastic, glass, or aluminum substrates or flash memory storage with floating gate transistors.

The devices for mediation also technically have a stable existence that can act as a physical footprint or placeholder for TBM works. For instance, Nam June Paik's *Electronic Superhighway: Continental U.S., Alaska, Hawaii* (1995) or Shigeko Kubota's *Duchampiana: Nude Descending a Staircase* (1991), can stand on their own as sculptural pieces even when unplugged. But, to enact the work as intended (i.e., to perform the work) a human audience requires a system of hardware, software, and flowing electricity to render the video data into a human accessible form.[350] Unlike

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[348] Laurenson, "Authenticity, Change and Loss in the Conservation of Time-Based Media Installations," *Tate Papers*, no. 6 (Autumn 2006), https://www.tate.org.uk/file/pip-laurenson-authenticity-change-and-loss-conservation-time-based-media-installations.

[349] Goodman, *Languages of Art: An Approach to a Theory of Symbols* (Indianapolis: Bobbs-Merrill, 1968).

[350] Though technically part of the TBM family, works on film, if kept as physical film, have more analog capabilities that avoid some of the technological dependencies of TBM. The frames in works that are still physically

a sculpture or painting that is immediately perceptible, though not necessarily logical as is the case with all art, TBM requires machine and electronic technologies for creation, storage, and exhibition not just as an afterthought or sidelined consideration. This factor is foundational for online installation because it acknowledges that TBM requires technological mediation and that that mediation, as our current technologies allow, results in some type of flat rendering confined by a frame with discrete boundaries and the point of screen or projection interface.

Digital video, in particular, was selected for the Online Exhibition Series because it was already dependent on monitors, on technological devices that frame and constrain aspects of the work. The degree to which the technological specifics are determined in the presentation of a work, however, varies across TBM and, given the fragility and obsolescence common to TBM, consistency is rarely possible. Videotape and film deteriorate, file formats become archaic, CRT monitors are impacted by unwanted magnetic fields, and the work's durational dimension imposes constant flux, among a number of other factors alter how and what ends up being displayed meaning that "trade-offs are part of the work."[351] Laurenson writes, "Time-based media installations allow for a greater parameter of change than many more traditional objects of fine art."[352] As such, TBM are inherently ephemeral in that they are created with an expectation of change and an identity defined by a "dynamic system" with a "cluster" of properties that rarely (if ever) remain the same.[353] Constantly fluctuating between states of dematerialization and

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film and purely visual can be immediately accessed by the human eye and, to get the duration aspect (moving image), no software is required to operate the projection machine.

[351] Laurenson, "Authenticity, Change and Loss."

[352] Laurenson, "Authenticity, Change and Loss."

[353] Pip Laurenson, "The Management of Display Equipment in Time-Based Media Installations," *Studies in Conservation* 49, sup. 2 (2004): 49, https://doi.org/10.1179/sic.2004.49.s2.011; Laurenson, "Authenticity, Change and Loss."

rematerialization means that the differences may occur with every new enactment.[354] Going back to Goodman, the essential, defining aspects of these properties are reflected in their "score" with "notations," but have room for change with every performance.[355] In many cases the specificity is left undetermined, or "thinly" described, leaving much of the display at the will of the curatorial team, but even the most sculptural and site-specific of TBM installations are defined by a set of instructions that allow for degrees change no matter how "thick," or rigid, those instructions may be.[356]

During CMOA's online exhibition series planning, the team recognized that this change could be beneficial. Video art could be temporarily domesticated and, thus, less polished to fit into an at-home environment. CMOA's staff selected works that were either already adapted to a web-based environment like Nguyen's *Tyrant Star* which has its own password-restricted online screening site, or those that were determined to have enough flexibility in their instructions to allow for an online iteration like Aiken's *migration* which has been displayed as a multi-channel work projected on giant billboards and the sides of buildings along with being made available with a linear, single-channel version.[357] During the online exhibition series, these works were all given the same aspect ratio, the same platform, and enveloped within the same framing devices without distorting the conception of these works as original. Many options are possible with video enactments and it is possible that they are all manifestations of the same work.[358]

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[354] Hannah Barbara Hölling, "Seeking the Authentic Moment: De- and Re-Materialisations in Paik's Video and Multimedia Installations," *AICCM Bulletin* 34, no. 1 (2014): 86. http://dx.doi.org/10.1179/bac.2013.34.1.010.

[355] Nelson Goodman and Elgin Catherine Z., *Reconceptions in Philosophy and Other Arts and Sciences* (London: Routledge, 1988).

[356] Laurenson, "Authenticity, Change and Loss."

[357] Diane Severin, Nyugen, "Tyrant Star," accessed April 9, 2022, http://www.tyrantstar.com.

[358] Hölling, "Seeking the authentic moment," 85.

The allographic and ephemeral characteristics of TBM are often compared to performance and many have argued that TBM work should be thought of in two stages: 1) "its score (the work's identity and installation instructions)" and 2) "its different manifestations (the work's iterations)."[359] This separation of score and performance closely resembles the distinction of Group 1 entities in the FRBR (Functional Requirements for Bibliographic Records) model used for structuring metadata in online library catalogs mentioned in the literature review. In this conceptual bibliographic model, entities are conceived of as: 1) work ("a distinct intellectual or artistic creation"), 2) expression ("the intellectual or artistic realization of a work"), 3) manifestation ("the physical embodiment of an expression of a work"), and 4) item ("a single exemplar of a manifestation").[360] Although there is an unresolved debate about the boundaries between expressions and manifestations, thinking of works with these divisions has aided in understanding entity relationships in online settings. Such a framework appears to be highly compatible with an online environment because the internet, too, is often understood as an active performance. Art historian and information scientist Alison Langmead notes that scholars of internet preservation are "exploring the importance of conceiving of the networked, digital environment not as a static object that can be directly preserved, but instead as a lived performance that is constantly unfolding and changing over time," which is an exploration that can be mapped onto the concerns of TBM.[361]

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[359]Joanna Philips, "Reporting Iterations: A Documentation Model for Time-Based Media Art," *Revista de História da Arte: Performing Documentation in the Conservation of Contemporary Art*, no. 4 (2015): 168, http://revistaharte.fcsh.unl.pt/rhaw4/RHAw4.pdf; Emmanuel Guez et al., "The Afterlives of Network-Based *Artworks*," 40, no. 2 (2017): 105-120. https://doi.org/10.1080/19455224.2017.1320299.

[360] IFLA, *Functional Requirements for Bibliographic Records*, 13.

[361] Langmead, "Art and Architectural History."

TBM are also collaborative by nature in a way that engenders the digital team-based workflows of online TBM exhibition. The creation, preservation, and exhibition of any artwork in a museum is naturally collaborative as is the work done with any object in any institutional setting, but TBM requires highly specialized, constantly developing expertise that includes whatever people oversee the museum's digital presence along with the networks of personnel and technology that make their work possible.[362]

After TBM leave the co-ops or studios that have shared techniques and equipment, they move into working relationships with post-production houses who are trusted to reformat and standardize the work, and are eventually partially transferred to the "interpretive authority" to the museum teams eventually being realized through these collaborative phases.[363] Because these phases were already present at CMOA, to support the onsite film and video collections, moving the works into the online space was much more feasible than if such a project were to be in a more silo-ed environment. That is not to say that CMOA or art museums in general are without their medium-specific silos, but more so that TBM naturally imposes an overriding mechanism.

There is also the perhaps undesirable collaboration between objects themselves when put into a gallery. As described in CMOA's TBM onsite exhibition, light and sound-based media cannot be fully contained to themselves; they impose themselves upon whatever is in their vicinity. Exhibiting TBM in an online space also built around light and sound allows for merging with the space instead of intrusion upon it. Museums' desire to exhibit, yet isolate TBM was also a

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[362] Philips, "Reporting Iterations," 177.

[363] Sophie Bunz, Brian Castriota, and Flaminia Fortunato, "How Sustainable is File-based Video Art? Exploring the Foundations for Best Practice Development," *Electronic Media Review* 4 (2015-2016): 2, https://resources.culturalheritage.org/emg-review/volume-4-2015-2016/bunz; Glenn Wharton, "Reconfiguring Contemporary Art in the Museum," in *Authenticity in Transition: Changing Practices in Art Making and Conservation*, ed. Erma Hermens, 27-36 (London: Archetype Publications, 2016), 2; Amy Brost, "A Documentation Framework for Sound in Time-based Media Installation Art," *Electronic Media Review* 5 (2017-2018), 3, https://resources.culturalheritage.org/emg-review/volume-5-2017-2018/brost-2.

suitability factor in online, at-home viewing. Each work in the online exhibition series was presented on its own webpage within the CMOA site, allowing the works their own space without fear of them overtaking the works around them. During their exhibition period, the uploaded video was embedded directly into the body of the page and accompanied by copy text and features not usually available on the gallery floor. This exhibition style allowed for the staff to frame each work separately and provide more robust details about the work and the artist than the standard museum "tombstone" label provides. The multimedia allowances of a webpage also permitted supplementary materials to be made readily available like stills from the work and the networked internet-based environment supported links to activities that encouraged a guided, yet intimate exploration of the work. The isolation and intimacy also created an environment where people were permitted to engage with the works at their leisure and in a setting that will most likely invade upon the TBM works instead of the other way around. Viewers could control the volume, the speed, and even pause the work all from the comfort of their homes.

The affordances described above made TBM, specifically video art, a prime candidate for online exhibition during the pandemic. However, aspects of the same ephemerality, collaboration, and isolation affordances of enacting a video work online also, in this case, acted as constraints each of which contributed to challenges in the online remediations of these video works.

Formatting was a concern for the curatorial team in several senses. File formatting became an integral consideration because the quick turnaround meant that the works selected needed to be online-ready in digital, single-channel, easy to upload but still representative of the original quality format. As staff noted, "only so many things are digitized or formatted in a way to go seamlessly online."[364] Although backlogs and slow turnaround for reformatting is common in many

[364] Turpin, interview with author, January 14, 2021.

institutions for many types of media, these issues consistently affect TBM collections because they have historically been challenging to work with and resource-intensive. On top of which, they rarely draw in financial consideration unless at an institution with donors and missions particularly directed toward new media, and your average museum visitors most likely would not put up a fight to make TBM available.[365] It is challenging enough to have visitors who are interested in viewing an entire TBM work, let alone fight for its existence. During my observational research, I found that very few visitors engaged with any of the video work on display at CMOA. This finding was supported by a curator who said during the interview, "Sometimes there's a weird barrier with visitors... I don't know if you have ever stood around a black box gallery for a while and seen how few people actually walk in."[366] The public interest in video work has been compounded with other political and practical considerations already mentioned in terms of isolation. The isolation of these works in the collection means that they receive less attention that might otherwise be afforded. Time and resources, especially since the 2003 disbanding, have been routed elsewhere leaving these collections stuck in time.

The curatorial staff also expressed frustration with the formatting of the presentation itself. The website effectively sanitized and regulated the works into a regimented form instead of an expression of the works themselves. Each page was laid out beginning with a full width still from the work, the embedded video, a brief description of the work and artist, then a few stills, and a canned description of the series and the film and video collection. Supplementary features lived in the right sidebar and the CMOA header/footer sandwiching it all leaving little room for curatorial

[365] Turpin, interview with author, January 14, 2021; Emily Watlington, "How Pipilotti Rist Made Menstral Blood Mesmerizing," *Art in America*, September 10, 2021, https://www.artnews.com/feature/pipilotti-rist-who-was-she-why-is-she-important-1234603482; Marina Isola, "An Uncertain Market for Video Art," *New York Times*, February 15, 1998, https://www.nytimes.com/1998/02/15/arts/an-uncertain-market-for-video-art.html.

[366] Turpin, interview with author, January 14, 2021.

design to be factored. At the same time, curators expressed that there was little connection with these works across all of CMOA's platforms, which essentially negated several of the factors that make an online, networked environment desirable. One curator said that if the exhibited works had been "better connected across [CMOA's] various online platforms, [they] may have been able to better align their commissions."[367] Without which, the supplementary features were inconsistently mobilized and felt haphazard to organize.

Additionally, the end-product was a concern. Although change is expected and even encouraged, especially with the selected works, art museums generally like to have some modicum of control over how a viewer will encounter a work. The affordances of making something available via the internet meant that much of this control was lost. Video, audio, and internet quality was dependent upon the viewers' hardware and location, making it impossible to know how the work would appear to a given viewer. These factors actually ended up changing how the staff worked with the video during programming as well. For instance, Nguyen's *Tyrant Star* audio and video was meant to be "buttery smooth" when played.[368] The odds of such a smooth presentation via Zoom, the museum's usual video conference platform, were considered impossible because of video conferencing's unpredictable quality due to internet connection and platform service issues that were especially prevalent during the early months of the pandemic. So, for the online artist lecture, the decision was made to avoid the joltiness and opt, instead, for purposely halted stills of the TBM work. When all was said and done for general viewership, however, the curatorial staff felt that the trade-off of accessibility outweighed the optimal conditions for viewing.

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[367] Ashley McNelis, email to Hannah Turpin, 2021, shared with permission during interview with author, January 14, 2021.

[368] Turpin, interview with author, January 14, 2021.

5.5 Summary

Video is a remarkable medium that transformed how we communicate through technology. The ability to see and hear an event that was previously recorded has altered economies, politics, information, and the social world, the effects of which cannot be understated. The qualities of video that made it revolutionary–its dynamism and vibrance, are also those that have positioned video as an encumbrance in art museums. The hardware and software needed to produce allographic video works on a gallery floor require more resources and maintenance than their autographic counterparts. And, when they do make it to the floor, their performed nature as waves of sound and light cannot be easily bounded making the enactment one that does not only concern them but the entire space they occupy. These challenges of affordance were offset when the presentation of video was remediated online at CMOA. Using Vimeo, the institution's website, and a type of media that has historically resigned itself to mutability in display styles, the museum avoided the technical hassles of enacting video onsite and the attempt to gain control over the presentation became the viewer's responsibility. While the limited capacity for curatorial direction through the website was not considered optimal, the shift into the online space allowed video to become a featured medium once again at CMOA.

6.0 *Time Capsule 21* at The Andy Warhol Museum

"What you should do is get a box for a month, and drop everything in it and at the end of the month lock it up. Then date it and send it over to Jersey."

Andy Warhol, *From A to B & Back Again: The Philosophy of Andy Warhol*

6.1 Introductory Vignettes

6.1.1 Time Capsules in the Archives Study Center

After working your way from the seventh level of the museum down, per the front desk staff's instructions, you come across a set of nested rooms where floor-to-ceiling panels separate the museum visitor from the collections stored behind. The panels are transparent revealing stacks of brown boxes on metal shelving, staged for the public in an idealized version of archival storage– one where the boxes are uniform in shape and color, backlog does not exist, and even the original inscriptions on the boxes have been preserved intact. The closed boxes regimentally stacked behind panes of glass let you know that they are cared for, accounted for, and valued as something that should be kept safe. The formidability and restrictedness of the boxes situated in an art museum devoted to the work of an artist who often plays with banality and conceptuality teases you. Is this room actually an archival repository or another gallery for works of art? Are the boxes displayed in such a way to signify that this is archives or that they are an artwork? Is there even

anything in the boxes? If so, is it precious? If so, how and why? Because it is archival documentation or because it is art?

Some of your questions appear to be answered in the tabletop glass display cases that line the inner room's borders. Each case is filled with layers of "traditional" archival objects from correspondence and business documentation to ephemera like luggage tags and brochures, and some less archival objects like ashtrays and fragrance bottles, their location and layout suggesting that these are samples of the box contents. After scanning the cases, you get a sense that these contents mean, or at least meant, something to someone and you can assume that that person was Andy Warhol. These items feel more like documentation from a life lived than the encapsulated contents of an artwork. This feeling is encouraged slightly as you realize that the items lack any content-specific contextual support, like text, audio, or video guides to help you understand how these objects relate to one another. Their style of display seems to imply that the objects can say all that they need to in relation to the items immediately around them. But, if they are life-records, their display as gutted innards removed from their context also feels somewhat invasive. Without being an expert on Andy Warhol nor how these items are meant to make sense, you spend about as much time exploring the items on display in the Study Center as you did when passing by the artworks on display in the museum's galleries.

On your way out of the room, you read in the vinyl text panel on the wall that the reality behind Warhol's Time Capsules is somewhere in between artworks and archival collection. The Time Capsules are indeed an artwork; one that is conceptual and sculptural in nature, as you gathered from the staging of the boxes. However, it is also true that the internal contents have been treated as archival materials in the sense that they are explicitly considered products of documentation alongside artistic productions. No more or less confused than you were when you

turned the corner into the space, you resign yourself to the ambiguity of Andy Warhol's Time Capsules and continue on with your day.

6.1.2 *Time Capsule 21* Online

Whether guided to it by the Carnegie Museums of Pittsburgh "From Home" consolidated resource page or you have some other interest in the Andy Warhol Museum, you end up on the parent page for Andy Warhol's *Time Capsule 21*. Underneath the website header information, you are greeted, or perhaps confronted, by two bars of large text that fill the entirety of the visible content area. The imposing title and short introductory blurb appear to be treated as both informational content and an aesthetic feature of the page as they beckon you to "explore over 50 objects" from the capsule. Scrolling down the page, the next large block of content is a short, looped video that flips between three layers of imaged items bound together by a gray background that simulates the darkness of an enclosed space. This animated feature accomplishes a couple of goals: it introduces you to the types of items contained in the capsule, providing both a conceptual primer and a visual appeal to any archival fetishization, and it alludes to several characteristics of how the items are enacted at the museum and exist inside their boxes, layered and without added contextualization.

One more scroll and you are brought to a two-columned grid of containers for clickable information, what website designers call "cards," that list the unofficial item series found in *TC21* designated as themes. After selecting any of the themes (Artwork, Julia Warhola, Photography, Correspondence, Business, Artist Friends, or Factory Shooting), you are brought to the online exhibition of that theme. In accordance with the rest of the website, the navigation of the exhibition page relies on vertical scrolling to guide you from the prefatory text through blocks of content.

The blocks vary in type but are mainly gallery sliders with images of *TC21* items, with accompanying tombstone text that you would generally find on a museum label for an artwork and explanatory text that contextualizes the item with other items in the theme and block, interspersed with related quote blocks from or about Andy Warhol. Though *TC21* items are at the fore, directing the exhibited discussion of Warhol's work, the items are complemented by related objects found in the rest of Warhol's art and archival collections including other Time Capsules, samples from video works, and related artworks.

You are not viewing the *TC21* items themselves; they are not technically immediately in front of you. You are looking at images of objects represented on your home computer monitor forced into a website design that is challenging to read with graphical features and layouts that often impede a comfortable or user-friendly viewing experience. You know that this exhibition is not the same as what you would see in the museum itself, perhaps even falling too short in auratic and experiential appeal, yet there is an appeal to the features made available only online by the museum staff like the thematic containers that aid in understanding the range of item types in the *Time Capsules* and the addition of textual and corpus contextualization. Although not presented with the breadth and depth of the entire *Time Capsule* series, you leave the online exhibition with a snapshot of the documented life of Andy Warhol.

6.2 Introduction

Reportedly spurred by a studio move in 1974, Andy Warhol began his "most extensive, complex, and personal work" known as *Time Capsules* (*TCs*).[369] Simultaneously derided as the detritus of a hoarder and praised for their usefulness in understanding the inner workings of Andy Warhol's life and practice, Warhol's hundreds of TCs are a keystone of the collections cared for by the Andy Warhol Museum (AWM).[370] During the initial Covid-19 pandemic-induced closures of 2020, the online exhibition of *Time Capsule 21* (*TC21*), was highlighted as the only object enactment the museum had to offer online. Unlike the other two enactments examined in this study, *TC21* was not a pandemic inspired enactment, but one created out of perceived necessity and utility given the circumstances of the AWM's relationship with Warhol's objects in years prior to the pandemic.

In this chapter, I discuss how and why Warhol's TCs, particularly *TC21*, were used and promoted as the only object-focused online enactment during the COVID-19 pandemic museum closures. I explore how the TCs are legible as both a serial artwork and as archival materials in a single-artist institution and how this ambiguity lends itself to styles of enactment both onsite and online. While the same methods were employed for this case as the previous two cases in this study, the historical description in this chapter looks different because the bulk of it is directed at a single institution as opposed to the heavier weight placed on institution type taken previously. This shift is in direct response to the locally specific enactment of the Time Capsules as ambiguous

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[369] John W. Smith, "Saving Time: Andy Warhol's Time Capsules," *Art Documentation* 20, no. 1 (2001): 8, https://doi.org/10.1086/adx.20.1.27949117.

[370] Matt Wrbican, "Warhol's Time Capsule 51," *Criticism* 56, no. 3 (2014): 688, https://doi.org/10.13110/criticism.56.3.0687; Smith, "Saving Time." Some places report 612 boxes, many say 610. The count on the AWM website as of February 2022 is 596.

objects variously treated as serial artwork, archival records, and simply convenient workarounds for legal challenges in a single-artist institution that operates within differently specified limitations than more encyclopedic museums. Warhol's Time Capsules are the physical embodiment of liminality; they somehow inhabit spheres of materialism and minimalism, artwork and archives, everything and nothing all at the same time.

6.3 Warhol's "Serial Attitude"

The social and political landscape of the post-war era led to a wave of countercultural upheaval and the emergence of the art movements that spoke to commodification and resistance. Two of these movements, pop art and minimalism, took up their concerns by appropriating the very processes of consumerism considered the ultimate means of suppression, particularly mass-produced consumer goods. Though odd bedfellows aesthetically and ideologically, both movements borrowed industrial concepts, techniques, and materials of mass-production particularly those of serial forms and repetition. A prominent figure in the pop art world, and a dabbler in minimalist concepts, Andy Warhol was well known for producing artwork that was serial in nature like his Campbell's Soup Cans (1962) and celebrity portraits. He was also notorious for his obsessive documentation and collecting practices that contributed to his artistic process and a record of his existence and the relationships of those around him. His Time Capsules operate in these spaces as both "sculpture" and a "register of the everyday."[371] This section describes the qualities of seriality in art and related features in archives as a foundation for understanding the

[371] Christopher Schmidt, "Warhol's Problem Project: The Time Capsules," *Postmodern Culture* 26, no. 1 (2015), https://doi.org/doi:10.1353/pmc.2015.0020.

affordances and constraints of the TC21 enactment. Both will be taken into account to understand the decisions made behind enactment.

6.3.1 *Time Capsules* as Serial Art

According at least to the lore perpetuated by those who have worked with the collection, Warhol considered his *Time Capsules* to be a work of art that was a commentary on the accumulation of things in modern society, his own predilections for "liking things," and a physical encapsulation of how he used collecting in his creative process.[372] He accumulated their contents and sealed them away to one day be displayed as one massive sculpture and purchased the mystery boxes now offered as marketing gimmicks across fandoms. The intention behind and manifestation of the *Time Capsules* firmly plants them in the realm of serial art.

A different idea than works "in a series" and not defined by any aesthetic commonality, serial art is used in conceptual art, pop art, and minimalism as a method "that adheres to a strict set of rules to determine its composition or to determine a series of compositions."[373] In an essay written for the 1967 *Art in Process* show at the Finch College Museum of Art, conceptual artist Mel Bochner bounded this method, or the "serial attitude," by three assumptions:

> 1. The derivation of the terms or interior divisions of the work is by means of a numerical or otherwise systematically predetermined process (permutation, progression, rotation, reversal).
>
> 2. The order takes precedence over the execution.

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[372] Wrbican, "Warhol's Time Capsule 51," 687-89.

[373] *Tate Art Terms*, s.v., "Serial Art," accessed June 30, 2022, https://www.tate.org.uk/art/art-terms/s/serial-art; Mel Bochner, "The Serial Attitude," *Artforum International*, December 1967, 28, https://www.artforum.com/print/196710/the-serial-attitude-36677.

3. The completed work is fundamentally parsimonious and systematically self-exhausting.[374]

Some of the underlying foundations of Bochner's assumptions were not universally agreed upon by all interested parties, notably former Artforum editor John Coplans. Coplans pointed out that Bochner's definition of "series" did not align with the mathematical concept of serial forms. [375] Coplans argued that serial art was art with a "rigorously consistent" structure "produced by a single indivisible process that links the internal structure of a work to that of other works within an undifferentiated whole"[376] Across the technical definitional discrepancies, serial art can, at the very least, be understood as art that relies on a macro-structure that governs a series of works. Serial works are "carried out… without adjustments made on taste..."[377] This means that objects created through the serial art process are intentionally not sacred to the artist; they are "autonomous and indifferent."[378] In text accompanying his *Serial Project, I (ABCD)* (1966), artist Sol LeWitt wrote, "The serial artist does not attempt to produce a beautiful or mysterious object but functions merely as a clerk cataloging the results of his premise."[379] The objects that are then produced are considered equal in value, to the artist at least, in that they are each equally representative of the same structure.

The serial process behind *Time Capsule* creation was relatively simple, especially when compared to the detailed schematics of the work mentioned above by Sol LeWitt, but technically

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[374] Bochner, "The Serial Attitude," 28; Smithsonian Institution, Exhibition records of the Contemporary Study Wing of the Finch College Museum of Art, https://sova.si.edu/record/AAA.finccoll.

[375] Coplans, "Serial Imagery," *ArtForum*, October 1968, 43.

[376] Coplans, "Serial Imagery," 35.

[377] Mel Bochner, "Serial Art, Systems, Solipsism," in *Minimal Art*, ed. Gregory Battock (London: Penguin Publishing, 1969), 100.

[378] Bochner, "Serial Art, Systems, Solipsism," 102.

[379] Lowry, Glenn D, ed. *MOMA Highlights: 375 Works from the Museum of Modern Art* (New York: MoMA Publishing, 2019).

rigidly structured and untastefully carried out, nonetheless. Warhol would leave a standard, file storage style, brown cardboard box by the side of his desk, then he and his assistants would fill the box with materials that accumulated during his daily life and work at an irregular pace. Once the box was considered full (the number of contained objects varies greatly from one to the thousands), his assistants would tape them up, label them, then stack them up for storage and display. The macro-structure of the TCs is elucidated in its external aesthetic with each box is being barely distinguishable apart from the traces left by the assistants in the tape job and identifying inscription. The more rigid serial sculptural qualities on the outside are not similarly carried through to the internal contents in a physical sense because anything encapsulated is the product of living with all the haphazardness of daily goings-on. This area would be the main point of contention for classification as a strict serial artwork because the rules are not hard and fast. However, as Coplans further refines, a "high degree of randomness in the use of infra-forms is possible" if the macro-structure is adhered to.[380] Warhol thought of each capsule as "complete in itself," making the capsules representatives of a macro-structure even in isolation.[381]

6.3.2 Archival Legibility

The AWM staff admit that the *Time Capsules* are a conceptual artwork along the lines of serial art, but the serial attitude in combination with the types (and amount) of materials compiled in the boxes have encouraged an archival approach to processing and storage of the work, thus

[380] Coplans, "Serial Imagery," 87.
[381] Steve Wide and Oehr Alice, *Warhol A to Z: The Life of an Icon from Adman to Zeitgeist* (Melbourne: Smith Street Books, 2018).

placing the cataloging and care of the collection in the purview of the archives.[382] So, too, Warhol's desire to "save things so they can be used again someday" provides an intentional overlap with archival practices.[383] Unlike Josef Albers' *Homage to the Square* series or Sol LeWitt's "half-off" cubes, both of which are featured examples in Tate's online glossary entry for "serial art," that used either painting on canvas, a traditional media combination in museums, or industrial materials, a common choice of conceptual artists, to create works of art, Warhol's desire to "save things so they can be used again someday" provides an intentional overlap with archival practices.[384] Warhol's *TC*s made of cardboard boxes from a local supplier and filled with a seemingly unsystematic selection of daily business recorded on paper or magnetic tape and mundane, household objects that look more like what you would find in someone's attic than on a gallery floor. Although the exhibition of everyday objects is not rare at a museum with contemporary artwork, Warhol's choices that allude to "the archives" in popular imagination and materially align with many archival practices instead of a serial sculpture encouraged the adoption of archival procedures.

This style of container and mass of materials is commonly confronted by archival professionals especially when working with collections of personal papers; Archivists often receive these collections of "records kept by an individual or family" in states of loose organization with little to no immediately distinguishable order and are then tasked with finding, or imposing, an order to make the materials accessible to researchers.[385] The creation of a collection hierarchy

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[382] Wrbican, "Warhol's Time Capsule 51"; Matthew Gray, interview with author, January 22, 2021; Wall text, *Archives Study Center,* The Andy Warhol Museum, Pittsburgh, PA.

[383] Andy Warhol, *From A to B & Back Again: The Philosophy of Andy* Warhol (London: Picador, 1976).

[384] Warhol, *From A to B & Back Again.*

[385] Society of American Archivists, s.v., "Papers," accessed June 30, 2022, https://dictionary.archivists.org/entry/papers.html; Laura Millar, *Archives Principles and* Practices (London: Facet Publishing, 2017), 145.

with series as the major unit of intellectual and physical organization. This type of "series" is less like serial art and more like series of art in that each series does not necessarily follow a set of rules that exists across each series nor do rules necessarily exist within the logic of each item in a series. There is simply an intellectual container that binds them together. The organization of containers is then recorded using descriptive documentation, often called Finding Aids, that act as textual summaries and points of entry to the collection.[386] In general, archival methods of arrangement and description have been effective in managing vast quantities of materials while maintaining contextual relationships, which appears to be what motivated their adoption to control the *TC*s' abundance of muddled materials inside each capsule.

To manage *TC*s, each box has been "processed" as if it were its own archival collection with series derived from the contents within each box, not across the entire serial artwork. As one finding aid states, "Unless otherwise noted, the arrangement scheme for the collection was imposed during processing in the absence of a usable original order."[387] The "otherwise noted" appears to be any grouping that has chronological aspects or alphabetical relevance. The details of each collection, or *TC*, are noted in a finding aid dedicated to that collection. The description of each item, however, moves the *TC*s back into the realm of art. In contemporary archival practice, collections are understood and managed, for the most part, in aggregate, meaning that a single paper-based item is rarely described on its own, and especially not described in the detail that is used in the *TC* finding aids even if the collection or item warrants item-level description.[388] While

[386] Millar, *Archives Principles and Practices*, 164-65.

[387] Margaret Huang and Kiera Rider, "Finding Aid for Time Capsule 534," Founding Collection, The Andy Warhol Museum Archives, accessed June 30, 2022. http://margarethuang.weebly.com/time-capsules-finding-aid.html.

[388] Note that this is a generalization. With all things archival, this practice varies widely between collecting institutions, collections, and media types. Photographs, audiovisual materials, and three-dimensional objects are often exceptions and digitized materials usually receive item-level description.

the collection-level description follows the archival rules for description, Describing Archives: A Content Standard (DACS), the item-level descriptions follow the "guidelines for best practice in cataloging and describing works of art" known as Categories for the Description of Works of Art (CDWA). By mixing these approaches, the AWM has been able to develop umbrellas of control that match the physical containers and maintain the relationships between the overall serial artwork while also being able to catalog individual items as artworks, a technique that has proven to be valuable for researchers and curators as evidenced by its continued use as a best practice in professional literature like the CDWA.

6.3.3 Exhibiting Serial Art and Archival Series

In recent years, there has been a push toward grouping Galleries, Libraries, Archives, and Museums together under the initialism GLAM because, as cultural heritage institutions, they all have the same overarching goals of gathering collections of cultural value and providing access to the knowledge held in those collections through education, exhibition, and research opportunities.[389] As it happens, they often even exist within the same building. While it may be productive to share resources across GLAM, each type and instance of these institutions have their own prerogatives in part because they have different collections and different specific goals. Warhol's *TCs* that cross these boundaries are examples of what happens when these lines get crossed. Along with altering the storage and cataloging of materials depending on which practices are applied, there are different considerations to take in mind when displaying serial art as serial art is understood in art museums as opposed to displaying a pseudo-archival serial artwork as if it

[389] Also suggested are LAM (taking out galleries) and GLAMR (adding records management).

can also function as a research collection. In this section, I briefly outline some of the differences in method and technique as background for how the AWM enacted *TC*s through a mixture of these exhibition approaches.

Exhibiting artwork, at its core, is arguably about communicating the artist's message while exhibiting archival materials is about communicating a theme or an idea that can be supported with collection materials. In the former, museums generally attempt to "let the work of art communicate directly with the viewer and to use exhibition techniques unobtrusively and with taste."[390] In the latter, the main goals are to educate about the theme and "to make the institution's holdings accessible and available to the public" as an outreach technique.[391] In both, curators have selected, organized, and provided interpretation for works in an exhibition, but they go about each of these tasks in ways that support the specific needs of the items, in terms of intention and materiality, and the goals of the institutions.

If Warhol's *TCs* were to be fully institutionally realized as an artwork, the exhibitional considerations of the work would be those of serial artwork, its conceptual home, and would utilize a display that allows the works to speak for themselves. Given the formulaic and ideological underpinnings, works of serial art are representatives of a macro-structure. This means that they can technically maintain their effectiveness when displayed both individually, existing in isolation, and alongside other works in the set. Coplans argues that their qualities are "more emphatic" when seen in context with one another but concedes that they can be exhibited alone because each piece must also be "complete in itself."[392] It follows that each individually established and self-contained

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[390] Alexander, *Museums in Motion*, 175.

[391] Shawn Aubitz and Gail F. Stern, Developing Archival Exhibitions, Technical Leaflet Series, no. 5, ed. Nancy Y. McGovern (Mid-Atlantic Regional Archives Conference, 1990).

[392] Coplans, "Serial Imagery," 179.

work in a serial art series must be exhibited as a whole in itself, even as it operates on behalf of a series. In other words, all the foundational features of the work must be able to be exhibited in a single piece of the series. In many cases, this means that the onsite enactment of these works would be the same as an individual work where the piece is displayed with works from related artists or movements in standard "white cube" galleries of contemporary art museums. If more than one piece of a serial work is shown together, they would take on the feel of an artist retrospective or dedicated exhibition that fills an entire area be that a corner in a room or several galleries.

How exactly an unadulterated version of serial art exhibition would occur for the *TCs* is not clear. If each of the items within the capsules were meant to be displayed, just one TC with its archival-esque multitudes of contents "would need an entire gallery… and even then, it's layers of objects."[393] This might look something like Song Dong's *Waste Not* (2005), a large-scale installation of over 50 years of Dong's mother's accumulated objects that takes up over 3,000 square feet.[394] On the other hand, if the idea of the box as a container of hidden gems were the focus as was originally described by Warhol in his proposal for selling the capsules, the items as one object would be the focus and could be contained to a more bounded display along the lines of Arman's *Poubelle* ("trash can") or *Accumulations* series from the 1960s, both of which are works of encased ubiquity.[395] When the most extensive exhibition of the *TCs* took place outside of the AWM, *Andy Warhol's Time Capsules* at the Museum für Moderne Kunst (MMK), Frankfurt am Main (2003-2004), the curators opted to select fifteen out of the then opened 200 capsules to

[393] Gray, interview with author, January 22, 2021.

[394] "Projects 90: Song Dong," Museum of Modern Art, accessed April 9, 2022. https://www.moma.org/calendar/exhibitions/960.andy

[395] "Artworks," Arman Studio, accessed April 9, 2022. http://www.armanstudio.com/artworks. Both of the artists mentioned in this paragraph have been referenced by the AWM as related works to the *TCs*.

display their full contents.[396] In the exhibition catalog, Mario Kramer, the MMK Curator of Collections during the exhibition, noted how the exhibition of these fifteen capsules filled six gallery spaces including the central hall of the museum.[397]

If the *TCs* were to be realized as an archival collection, thus considered archival records that are "used to remember events or information or to provide accountability for decisions or actions," they would be employed mostly to raise "the awareness of the institution and the nature of its holdings and services" along with providing information about the selected topic.[398] Exhibiting archival records, or enacting them onsite in this case, also often displays items removed from their series which is practical for many reasons including the sheer amount of space that the display of a full archival series, or more likely collection, would require. However, these items would not be considered a single piece that operates from the same logic as any other in the collection. Instead, the items selected for an archival exhibition are representatives of a theme or an idea selected for their "visual impact and familiarity."[399] Those that have been deemed to have "exhibition value," act as highlights of more expansive thread found in the collections and are usually readily recognizable to draw a passerby in or give them something to talk about when they go home.[400] In order to maintain visual appeal with majority paper-based, two-dimensional works, the visual relationships and variance between the selected items is also considered.

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[396] "Andy Warhol's Time Capsules," Museum für Modern Kunst, accessed April 9, 2022, https://www.mmk.art/en/whats-on/andy-warhol-time-capsules.

[397] Mario Kramer, "The Last of the Wunderkammern," in *Andy Warhol's Time Capsule 21*, ed. John W. Smith and Matt Wrbican (New York: Distributed Art Publisher, 2003), 14-21.

[398] Millar, *Archives Principles and Practices*, 193, 267.

[399] Aubitz and Stern, *Developing Archival Exhibitions*, 4-6.

[400] Jessica Lacher-Feldman, *Exhibits in Archives and Special Collections* Libraries (Chicago: Society of American Archivists, 2013), 8-9.

In a web-based environment non-digital serial art is generally accessible like any other non-digital work available online, which is through catalogs with surrogate images and images of installation views. Mentioned in the introduction to this dissertation, new software and hardware have increased the availability of online offerings of cultural heritage objects with art museums now offering virtual experiences like curator-led tours of galleries, self-guided virtual reality tours, and detailed-oriented explorations of a single work, all which have only recently become possible due to the affordances of digital imaging and display technologies.[401] Apart from these approaches that utilize more recent technological possibilities, the online exhibition of multiple artworks usually follows the same patterns of creation and display that libraries and archives have been using since before the launch of the World Wide Web in 1992.[402] From a bird's eye view, these exhibitions have a sequential layout that intersperses digital reproductions of collection items with descriptive, interpretive, and contextualizing text or audio accompaniment.[403] Traditionally, digital archives exhibitions were mainly created as surrogates for onsite exhibitions to provide even further access to patrons through the capabilities afforded by the digital communications technologies. To date, the same goals apply, but online exhibitions are now also often independent projects with dedicated resources.

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[401] Some examples include: "Exhibition Guide: Andy Warhol at Tate Modern," Tate Modern, accessed June 30, 2022, https://www.tate.org.uk/whats-on/tate-modern/andy-warhol/exhibition-guide; "Experience the Night Watch," Rijks Museum, accessed June 30, 2022, https://beleefdenachtwacht.nl/en; "Age Old Cities: A Virtual Journey from Palmyra to Mosul," National Museum of Asisan Art, accessed June 30, 2022, https://asia.si.edu/exhibition/age-old-cities-vr-360-video/?utm_source=siedu&utm_medium=referral&utm_campaign=exhibitions.

[402] See for example: Audrey Fischer, "Online Museum: Twelve Electronic Exhibitions Available from the Library," *Library of Congress Information Bulletin* 55, no. 12 (1996), https://www.loc.gov/loc/lcib/9612/online.html.

[403] Grace L. Barth, Laura Drake Davis, and Amanda Mita, *Digital Exhibitions: Concepts and Practices*, Technical Leaflet Series, no. 12, ed. by Christopher Hartten and Heidi A. Moyer (Mid-Atlantic Regional Archives Conference, 2018).

6.3.4 *Time Capsules* at the AWM

An ongoing project with little fanfare while he was alive, Warhol's *TCs* rarely saw the light of day after they had been sealed and shipped off to his warehouse in New Jersey. After his premature death from post-operative complications in 1987, a "triple entente of divergent interests" collided to bring the largest collection of Warhol's paintings, drawings, film, video works, and the *Time Capsules* to their permanent home Andy Warhol Museum in Pittsburgh, Pennsylvania. [404] Detailed in the historical summary of the Carnegie Museums of Pittsburgh by Robert Gangwere, the Dia Foundation and the Andy Warhol Foundation for Visual Arts were looking to form a small museum focused on Warhol's work that could double as collection storage and maintenance. Against the desires of Warhol who wanted his work to stay in New York City, the Carnegie Institute came up with a deal too good for Dia and the Warhol Foundation to refuse especially after they had exhausted most of their options in New York.[405] The three organizations worked together to establish the Andy Warhol Museum in 1989. As part of this agreement, both foundations offered to hand over the majority of Warhol's works they had in their possession while the Carnegie Institute promised to renovate a building and care for any collections handed over. With this agreement, the physical materials were under the purview of the museum, but the licensing rights stayed with the Warhol Foundation. After facing numerous financial crises, which slowed down the construction, the museum opened its doors in 1994.

The *Time Capsules* came to the museum in 1994 as part of the agreement with the Warhol Foundation under the care of conservator John Smith and Matthew Wrbican, who had been hired

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[404] Andy Warhol Museum, *The Andy Warhol Museum* (New York: Distributed Art Publishers, 1994).

[405] Andy Warhol Museum, *The Andy Warhol Museum*. Warhol was not particularly fond of Pittsburgh. He often avoided questions about his hometown, preferring it to be a mystery rather than revealing the truth.

to work with these materials by the Warhol Foundation in 1991. Both men had backgrounds in art but found themselves working with what were designated the archival collections at the AWM, including taking lead of the *TCs*.[406] Wrbican became the chief archivist and held that title until 2019, when Matthew Gray became the first credentialed archivist to oversee the collections.

Single-artist museums are often beholden to the whims and personalities of the artist and their representatives. In this case, these whims were originally overwhelmed by the mass of boxes filled with every type of object that you could fit into a box from newspaper clippings and correspondence to bottles of fragrance and an inflatable cake.[407] The foundation and the archivists in title decided to pursue a pseudo-archival process to re-house, catalog, and describe the capsules. Mentioned above, the boxes were arranged like an archival collection but described using a mixed-bag approach that incorporated both art and archival cataloging styles. The ideological constraints that would normally force the boxes into one state or the other can often be overlooked in a single artist institution because these determinations are based on the world created by the artist. Words and concepts do not have to mean what the whole art world means, but, instead, they get to mean whatever the artist or their representatives say they mean. In this case, Warhol's world was one that supported such ambiguity.

The legal constraints imposed in these settings, however, are often prohibitively strict, take, for one notorious example, the Clyfford Still Museum in Denver, CO. As stipulated in its endowment agreement, the museum is legally not allowed to exhibit any works of art by other

[406] Wall text, *Warhol's Collection,* The Andy Warhol Museum, Pittsburgh, PA. Almost any object that "belongs" to the AWM, including Warhol's collection of decorative furniture and a suit of samurai armor, is considered part of the "archives collection.

[407] Gray, interview with author, January 22, 2021.There are several inflatables in the capsules that are still inflated to this day. That cake mentioned here was a gift from Yoko Ono in TC527. The museum had to ask Ono to reproduce the cake for an exhibition loan copy because the air pressure changes during transit are considered too risky for the original.

artists in the Still's onsite galleries.[408] The AWM does not have quite the same level of restrictions, but the licensing agreements mentioned above have imposed potentially undue challenges on the museum. Because the AWM does not own the reproduction rights to any of Warhol's works apart from film and video, they have to license works from the Warhol Foundation if they want to use them in any advertising or online just like any other paying customer. In turn, since the museum cannot make money from licensing, they have very little to spend on expensive fees. When they do obtain a license, further restrictions are imposed on the size and downloadability of anything posted online. To get around the expense of such limitations online, the museum rarely relies on reproducing singular artworks and instead relies on images taken of gallery installations and already approved content including digital reproductions of *TC* contents, specifically that of *TC21*. Onsite, the capsules are promoted as a unique resource that can only be found at the AWM.

6.4 Affordances Across TC Enactments

A serial artwork that masquerades as an archival collection, the unsettled existence of Warhol's *Time Capsules* has not been an issue in its final resting place. The capsules can simultaneously inhabit the work of sculptural serial art and pseudo archival collection without being forced into one mode of existence because of their situatedness in a single-artist institution. Arguably, such a juxtaposition frequently occurs on a smaller scale with items categorized as works of art found often in archival collections and some works of art that seem to be materially archival, or at least look that way but it is quite possibly only in a single-artist institution where a

[408] The Still has found workarounds like virtual superposition and artist curated shows of Still's work.

work of this magnitude could live in this constant state of vacillation. In these institutions, institutional boundaries are often blurred or rigidly bound at the behest of the usually deceased artist or their associated organizations. As the painter Brice Marden said, "If you have your own museum, when you end up dead, you're still in control."[409] In this case, the Andy Warhol Foundation and the Andy Warhol Museum are in control and they have elected to uphold the ambiguity, often switching between exploiting the serial art aspects or the archival qualities to suit whatever their needs. This flexibility has put the *TC*s at the forefront of many AWM initiatives including being the only online exhibition.

In this section, I detail how the ambiguous character of Warhol's "problem project" continues into the onsite and online enactment on *Time Capsules* at the AWM.[410] Art and archival practices have been weaved together throughout both exhibition styles demonstrating the utility, in some respects, and the challenge, in others, of working with a mutable collection under the purview of a single artist institution. Then, by identifying affordance shifts between the two, I find that the archival characteristics of the work were given preference during remediation.

6.4.1 Onsite Time Capsule Enactment

The sometimes competing, sometimes complementary double duties of the *TC*s are visually enacted onsite at the AWM in the "Archives Study Center." The study center is a pair of nested rooms that were built as a dedicated gallery space for exhibiting *TC*s and as a workspace and reading room for the archives staff and researchers. The decisions made in the onsite enactment

[409] Deborah Solomon, "Art/Architecture; for Individual Artists, Museums All Their Own," *New York Times*, March 28, 1999, https://www.nytimes.com/1999/03/28/arts/art-architecture-for-individual-artists-museums-all-their-own.html.

[410] Schmidt, "Warhol's Problem Project."

of the serial artwork in these rooms intentionally play into the charm of archive-ness while situating the work as a room-sized sculptural serial artwork.

Described in the introductory vignette, one of the rooms wraps around the other in a horseshoe so that three glazed walls of the inner room can peek into the larger room with the fourth being the connection to the main museum (Figure 11). Immediately behind these walls is floor-to-ceiling metal shelving with rows of original *TC* boxes encased in clear, most likely polyethylene, bags that reveal the original markings and wear on the boxes that once sat next to Andy Warhol's desk and now holds what some consider the most valuable research materials available about the

Figure 11 Archives Study Center, Time Capsule display.

artist and his environment.[411] In the case of Warhol who was notoriously "terrible" at taking notes, these capsules are his personal diary or what one philosopher, Anita Allen, deemed his "campy, fragile, self-involved" memory.[412]

Backlit by the standard office lighting used to illuminate the workspaces visible through the spaces between the boxes, the walls of boxes act as a room sized, sculptural box-like container of the inner gallery space mimicking the relationship between the *TC* boxes and their internal contents. And, indeed, this internal chamber is lined with seven flat vitrines filled with examples of *TC* contents. These wood paneled and chunky display cases showcase a rotating selection of items from various capsules often presented with little to no additional textual context provided as to the origins, importance, or even from which container the contents have been pulled (Figures 12 and 13).[413] Little is known about the curatorial decisions behind these selections from the visitor's perspective other than that there appears to be some sort of systematic grouping. According to the Manager of Archives, Matthew Gray, there is an intended flow to the vitrines and calculation behind the item selection, but the rationale is implied rather than explicated to the visitors.[414] Much of the context must be derived from the items in the immediate vicinity and your recently gained framing of Warhol during your journey through the museum's galleries.

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[411] Smith, "Saving Time," 11.

[412] Gray, interview with author, January 22, 2021; Smith, "Saving Time," 12; Anita L. Allen, "Dredging up the Past: Lifelogging, Memory, and Surveillance," *The University of Chicago Law Review* 75, no. 1 (2008): 48, http://www.jstor.org/stable/20141900.

[413] In early 2022, the display cases Archives Study Center have been devoted to commemorating Matthew Wrbican's with the collection and the post-humous publication of his book "A is for Archive." As such, the cases have much more textual supplementation than previous content rotations.

[414] Gray, interview with author, January 22, 2021

Figure 12 Time Capsule object display (1).

Figure 13 Time Capsule object display (2).

6.4.2 *Time Capsule 21* Online

Of the over 600 *Time Capsules*, the contents of *TC21* have received particular attention because they were one of the first opened capsules that had a wide range of recognizable items that "stand alone."[415] These qualities are thought to evoke a strong, immediate attraction that make them visitor-friendly content. Dating from the 1950s to the 1970s, contents of this box includes 204 photobooth strips of "the Warhol stars," six self-portraits, other photographs used as source material for paintings, materials related to when Warhol was shot, and illustrations by his mother. The capsule covers many foundational thematic and processual bases of Warhol's work. Like the rest of the *TC*, *TC21* has rarely ever been enacted in the galleries at the AWM. It has, however, earned an indefinite spot on the AWM website.

As early as 2005, items from *TC21* were photographed and digitally reproduced in a web exhibition format at the museum. According to remnants scattered across the internet, this iteration of the exhibition required the use of Flash Player software to "tour" through select items (Figure 14).[416] The Internet Scout Research Group's 2005 Scout Report detailed the exhibition:

> Dating from the 1950s to the 1970s, this particular capsule contains a great deal of Warhol's work, and the online exhibition allows linking to contextual material. For example, the caption to a Polaroid portrait of YoYo Bischofberger, the wife of a Swiss art dealer, explains how Warhol used Polaroids as part of his portrait-making process, and links to a collage of Warhol portraits, a portrait of Debbie Harry, and a video of Warhol taking

[415] Gray, interview with author, January 22, 2021

[416] Internet Scout Research Group, "The Warhol: Time Capsule 21," *Scout Report*, December 16, 2005, https://scout.wisc.edu/archives/r23903/the_warhol_time_capsule_21.

photographs of Harry in preparation for making her portrait. There is also a 7-page inventory of the complete contents of Time Capsule 21.[417]

The last crawl performed by the Wayback Machine of the exhibition was in 2017, after Adobe announced that it was ending support for the Flash Player software in the coming years. Many of the affordances described in this summary such as the ability to create context through linking and additional descriptive text appear to have been transferred to the iteration that was available and pointed to in CMP communications as a stand in for the museum experience during the first year of the Covid-19 pandemic in 2020. Sometime between 2017 and 2020, the AWM website was updated to include a JavaScript version of the exhibit that aligned with the overall layout of the museum's site. This meant that the exhibition became less about linkages and more about a linear layout with content embedded in thematically determined pages.

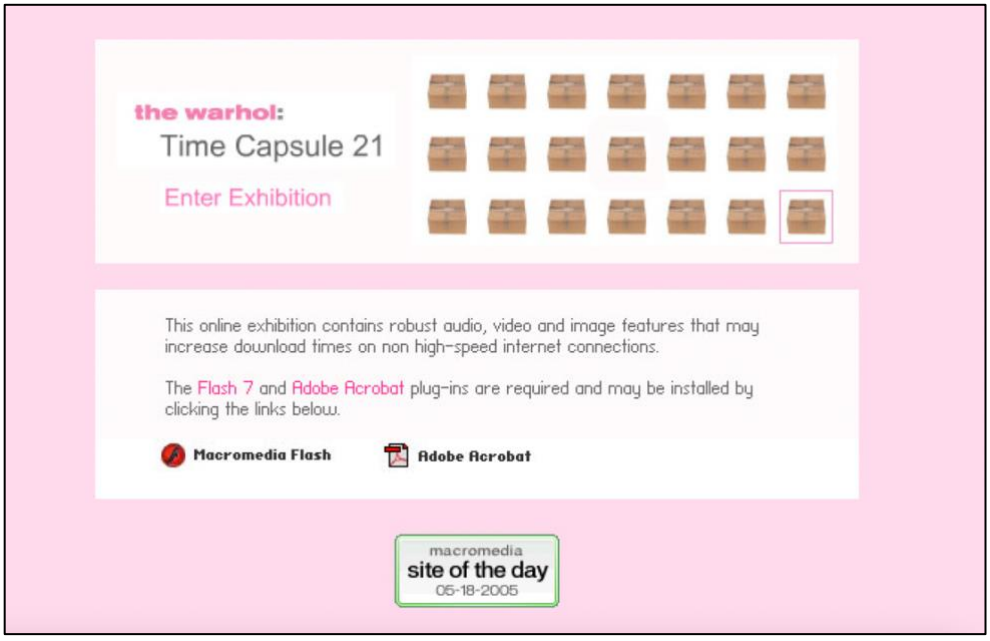

Figure 14 Entry to the Flash Player iteration of the Time Capsule 21 exhibition.

[417] Internet Scout Research Group, "The Warhol."

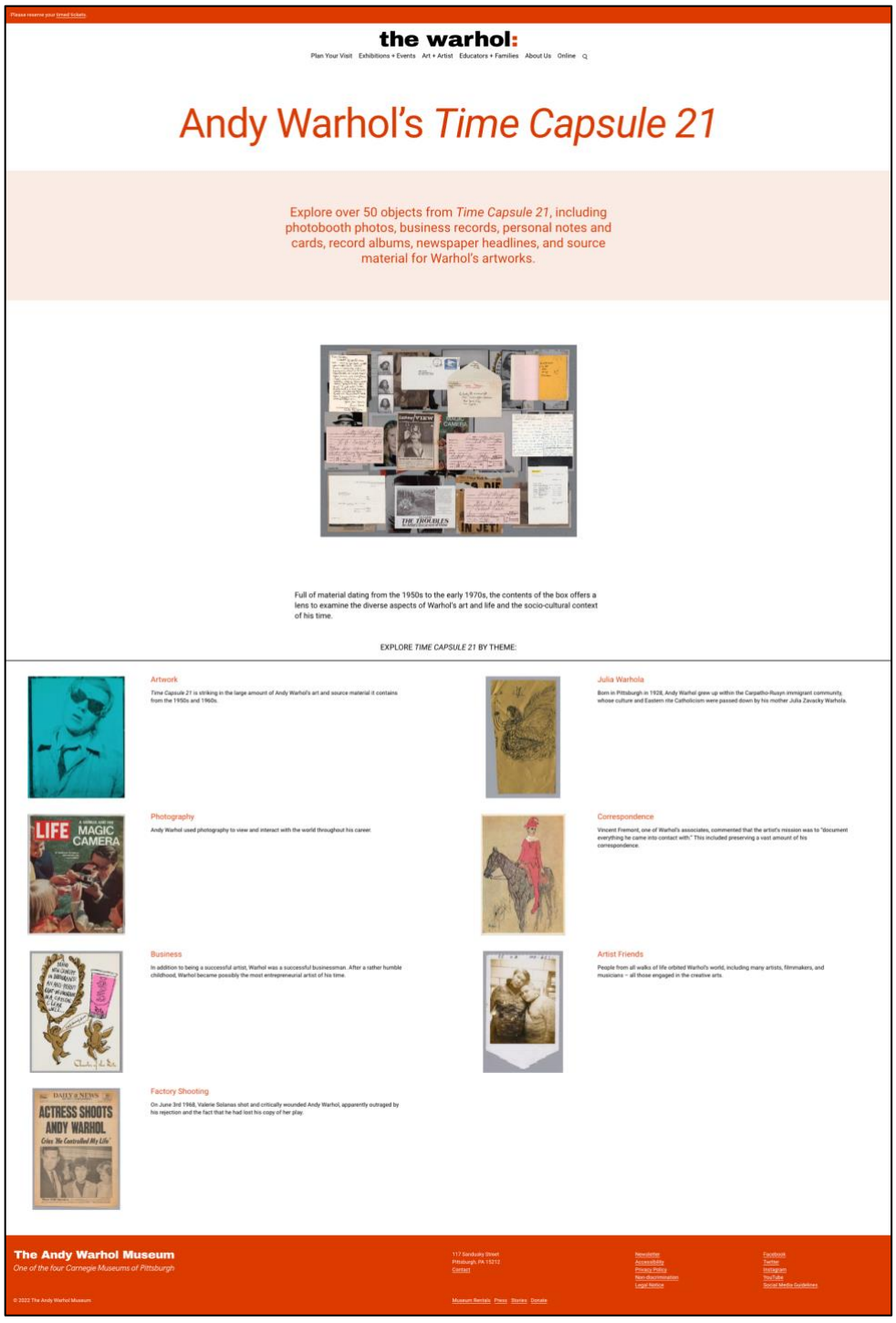

Figure 15 Introductory page to Javascript iteration of the Time Capsule exhibit.

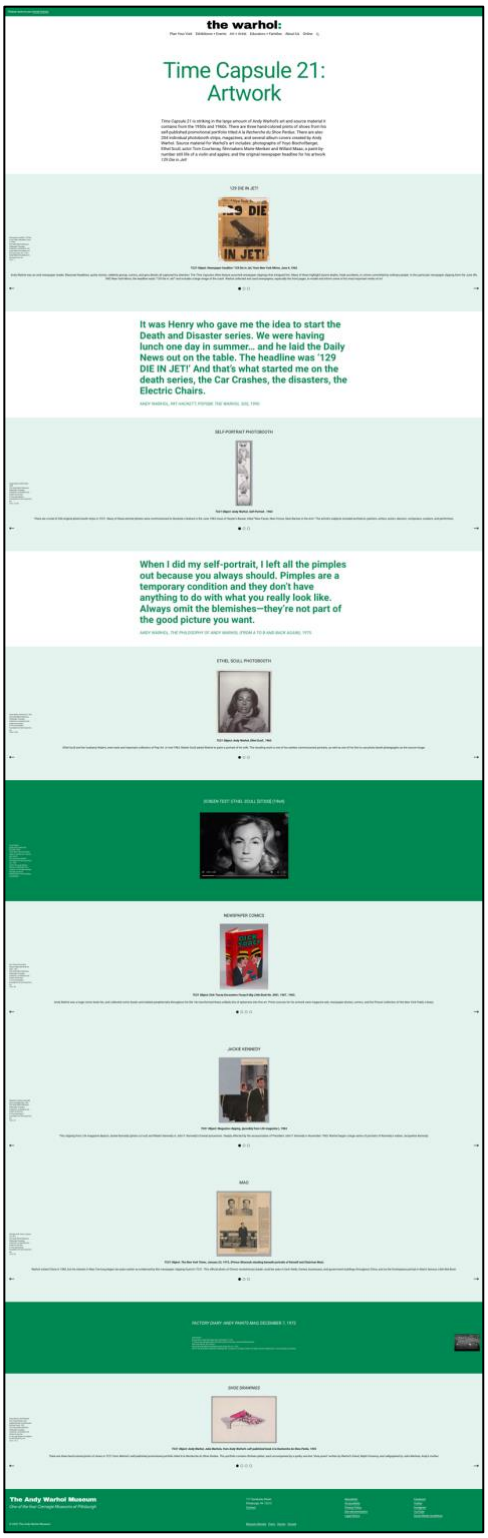

Figure 16 Full "Artwork" page layout.

Figure 17 GUI view of "Artwork" exhibit page at 100% scale in browser (1).

Figure 18 GUI view of "Artwork" exhibit page at 100% scale in browser (2).

A visitor to the online exhibition is first shown an introductory page with teaser text, an embedded video with materials from the box shown in an infinite rotation of layered objects (Figure 15). The meat of the exhibit is partitioned into separate "child" pages devoted to curated themes that can be accessed by selecting the corresponding preview "card." The themes have varying item amounts and detail, but they all include bars of text interspersed with slider galleries that feature images of two-dimensional objects and "pull out" quotes (Figures 16, 17, and 18). Several also include digitized films and videos. The sliders provide what seems like directly transferred relationships from the linked flash player version. In most of these, there is an image of a *TC21* item accompanied tombstone text and a short paragraph providing context to how the object fit into Warhol's life. If you follow the slider arrows, links are often made to related artworks not included in the capsule or to other *TC21* items. Links to supplementary content about art techniques or related education content are also made via hyperlinked text.

6.4.3 Affordance Identification

The affordances of *TCs* that transferred into the online environment are those that I have argued are archives adjacent, or desired in archival settings and considered standard features in online archival exhibitions, though not all exist in the current onsite enactments. These include the ability to combine and allow for control of mixed media, explicitly direct a visitor through the media, and increased ease of contextualization through linked and textual content. In this case, these features have allowed for a richer online enactment in an archival sense, an exhibition that "involves the absence of the archivist – the documents must be their own ambassadors; it must

stand alone, and be a thing in itself."[418] By exploiting these features, the enactment preserves more of the content, context, and structure of the items, all of which are considered fundamental aspects of an archival record.

Given Warhol's penchant for using a wide variety of media, the AWM is particularly adept at balancing these concerns with the fact that it would be incomprehensible to not have multiple media in an Andy Warhol museum through the use of dedicated spaces or complementary placement of more intrusive content. Additionally, as a visitor learns about Warhol or is already aware of his work when they visit the museum, they should become comfortable with such a combination. Combining media formats onsite is a common practice in museum exhibitions, however, as discussed in the CMOA chapter, some types of media can be more intrusive in certain settings than helpful. The light and sound waves of video and audio, for instance, either run on a loop or activated by a visitor, can detract from the goals of an object enactment by pulling the focus away from static objects or by contributing to sensory overload. In a webpage, these features can be embedded in such a way as to be controlled by the viewer to avoid sensory pitfalls while placing the content in direct visual conversation with static items. Even in cases where the audio or video is on "autoplay" an online visitor can override this imposition through the sound controls on their personal hardware. The AWM took advantage of these possibilities by adding related digitized film and video in conversation with items from the capsules in their online *TC21* enactment with player controls.

The divvying up of control between visitors and curators also shows itself in the way that someone can be lead through a digital exhibit using the format of the website to encourage a more

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[418] "British Records Association: Annual Conference 1971," *Archives: The Journal of the British Records Association* 10, no. 47 (1972): 107-116, https://doi.org/10.3828/archives.1972.5.

explicit flow. While it can be assumed that most visitors to a museum based in the United States and catering to English-speaking audiences will engage with the onsite capsule vitrines moving from left to right, per the prescribed directionality of our writing system, there is currently no other method for guiding an unattended viewer through the Archives Study Center. Online, the *TC21* enactment uses the architecture of the AWM website to direct viewers to move down the exhibit pages, read left-to-right, and interact with sliders through horizontal movement. Even if the overall exhibition navigation is lacking, discussed in the constraints section below, it is very clear how a person should navigate inside the thematic pages according to standard English website architecture.

There is also additional clarity through the contextualization methods adopted in the online enactment like the hierarchical relationship of pieces to the whole and the addition of identifying, describing, and contextualizing text. Using the parent-child webpage hierarchy and prefatory text, it is understood that each theme is a group found within *TC21*. Once you are inside that theme, every item is clearly identified with a title, a unique character string as an item identifier, and information about its ownership displayed next to the digital image. These singular items are additionally put in context of the network of Warhol's oeuvre by placing them in visual relationship with other items from the capsule and related artworks. This is not to say that more contextualization is either needed or not possible in the onsite enactment, but simply that these methods were more readily adopted in the online enactment.

While the archivally adjacent aspects of the capsule enactment are enhanced in the online exhibition, there are several notable constraints that could be considered drawbacks when the enactment is forced into a hypertext document webpage displayed in a web browser as opposed to how the capsules are enacted in the Archives Study Center. Recalling Benjamin's "aura," there are

elements of objects that are considered "unreproducible."[419] I do not bring this up to discuss issues of authenticity, as Benjamin and others debate in discussions of the aura, but to point to aspects of the onsite capsule enactment that were not carried over to the online enactment and may never be able to be accomplished (or desired) in such an environment.

The first of these aspects is the intimate relationship afforded by the onsite enactment. The appeal of the overall onsite display is no doubt meant to play on the voyeuristic aspects of archival work, which often includes peering into and dissecting the personal lives of the people who created and worked with the records. With glass walls lined with boxes, your vision is obscured by the boxes, however, you are left in limbo as to whether you are the voyeur or that there is someone watching you, the answer is probably both. Enveloped by the boxes and surrounded by capsule contents, you are not only a voyeur of the objects around you, but you also effectively join their ranks as contents of the *TC*s. You temporarily become boxed into Warhol's agenda even if your presence may not permanently contribute to Warhol's object history; Like Warhol keeps you in one of his boxes, on one of his recordings, in one of his paintings like he did with everyone else who was once a part of the Warhol friend group.

Additionally, your proximity to the items can add a level of allure even if separated from the items by a thin pane of plexiglass. The enclosure, closeness, and perceived freedom to explore created by the physical layout of the Archives Study Center and display of the capsules affords a more viscerally intimate and less prescribed engagement than the online version which was chosen because it was what the institution would support given funding, personnel, and timeline limitations, not because it was considered the "best" fit for the enactment. It was easier and more

[419] Benjamin, "Work of Art in the Age of Mechanical Reproduction"; Gorzalski, "Archivists and Thespians."

streamlined to try to plug the exhibition into a digital system that had already been decided upon and had active support. Though practical from the institutional side, this approach does not align with the intentions of previous enactments. The rooms that were built around and for this work to be displayed onsite or the first iteration of the project built to capitalize on the affordances of interactive, web-based technologies seem like distant relatives. Instead, the items were inserted into a webpage structure that is not compliant with basic ADA accessibility guidelines let alone built around the display of images.[420]

Mentioned earlier, these issues may be the by-products of licensing challenges–the website must somehow elucidate its function as the website of a single artist museum, thus requiring visual interest, without the use of artwork images. However justified in theory, these decisions to squeeze the exhibition into the main website's responsiveness and design resulted in the creation of an exhibit that is challenging to navigate and visually experience. For an example of the former, no local pathways are established to navigate back to the introduction nor the other themes; If you enter a theme page, it becomes a standalone page detached from the overall exhibition with its web location only apparent in the breadcrumb text of the URL. Evidence of the latter exists in the inability to read or see any major content chunks at one time. For almost every section, a user would need to adjust their browser window, scale the page down, or constantly be scrolling to view any given section of a page all at once (See Figures 18, 19, and 20 for the entire content compared to what a visitor sees in their browser window at scale). Also, the small interactive features, like the slider arrows, activate an entire page alteration that moves the content around without adequate points of reference.

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[420] Civil Rights Division, United States Department of Justice, "Chapter 5, Website Accessibility Under Title II of the ADA," ADA Tool Kit for State and Local Governments, issued May 7, 2007, https://www.ada.gov/pcatoolkit/chap5toolkit.htm.

6.5 Summary

Warhol intended for capsules to be separated, to be sold off as pieces of the serial Time Capsule artwork with their contents only within reach once they had become part of someone else's art collection. Instead, they were permanently housed in a location that would have disappointed Warhol and utilized as an aggregated research collection because these objects of memory looked like an archival collection. The shift in identity has been seen as worthwhile for the AWM, allowing it to have ownership of objects that were created by the artist given the constraints of the business arrangements surrounding the rest of Warhol's work, but has also resulted in the capsule's amorphous existence fluctuating between serial artwork and research collection. While this indeterminacy has proven to be productive in many respects for the museum, it has also complicated how the materialities of the capsules work in relation to the affordances of mediation strategies during their enactment. Onsite, the display flows through identities, making both aspects of seriality and archival clutter visible at the same time. Online, the flow is forced into the blocked natured of the AWM website and, while the affordances of a webpage provide many avenues for exhibition, the version described in this research is restricted by the design of the overall website and did little to support TC21 as either a serial artwork or an archival collection.

7.0 Conclusion

When thinking about how digital reproductions influence cultural policy, cultural historian Ole Hylland asks, "do digital tools simply give museums an opportunity to fulfill old tasks in new (and better) ways, or do they open for new and unprecedented responsibilities?"[421] In this dissertation, I detailed three cases of remediated object enactments at the Carnegie Museums of Pittsburgh through object biographical case studies in which I drew upon interviews, observations, and documentation to trace varying activations of materialities through a sociomaterial lens in the previous chapters. These cases demonstrated that cultural heritage institutions have additional, if not altogether new, responsibilities to their objects and their audiences in understanding the consequences of digital remediation practices.

The overall reason behind this increased responsibility is also the overarching conclusion of this study and one that confirms suggestions in museum studies that we need to think of digitally remediated objects as objects "in their own right;" that is, a one-to-one transfer of materialities between onsite object enactments and their online remediations is not possible.[422] The online representation and computer mediation of the object is an ontologically different *thing from the object itself*. It can be interacted with differently, contextualized differently, controlled differently, experienced differently. When thinking about how objects become and function as digital objects, This may be so obvious it could go without saying given our current-day familiarity with the drawbacks and supposed opportunities of computational technologies both in research and in our

[421] Hylland, "Even Better than the Real Thing?" 63.
[422] Meehan, "Digital Museum Objects and Memory," 1.

daily lives, but I stress it here to corroborate the idea that remediating an experience of an object creates a new experience; one that engenders new responsibilities regarding the sociomaterial consequences of remediating an object enactment.

Complicating the matter is that the *new thing*, the new enactment, remains relational. As the biographical examination of each of the cases in this study demonstrated and as the term *remediation* indicates, the online object enactments are digital reproductions and representations of types of enactments that occur onsite at these museums. So, the question becomes, how do we understand and engage with this new construction of objects, practices, and mediation in an online space given that the enactments are situated in institutions with storied pasts, with objects that have been turned into particular types of museum objects, and by representations subject to technological capabilities that are constantly in flux?

In this dissertation, I investigated how enactments were envisioned by the museums studied during the remediation of the Live Animal Encounters at the Carnegie Museum of Natural History, the Online Exhibition Series at the Carnegie Museum of Art, and *Time Capsule 21* at The Andy Warhol Museum. Within each of the cases, I explored the rich historical and presentational relationships that formed the foundations of these enactments and found that the materialities activated varied greatly between the types of objects, the types of institutions, and the selection of remediating applications. In this final chapter, I respond to my research questions by discussing cross-case challenges of success determination and loss of afforded materialities between the original enactment and the remediated enactment.

I argue that cultural heritage workers need to actively acknowledge what sociomaterial affordances they are giving up in favor of others–a determination I refer to as the threshold for acceptable affordance loss–when adopting online object-based mediation strategies both to set

realistic expectations of the audience experience and to understand the educational and experiential impact of using certain representational systems when digitally mediating museum objects. I do not wish to argue that any of the "original" aspects of onsite mediation be maintained during remediation. On the contrary, I think the productive destruction of some of these aspects could be a wise decision. However, the biographies of the enactments studied in this dissertation support the idea that one must know where they are coming from to know where they are going. In this chapter, I offer strategies to identify and account for acceptable affordance loss across three dimensions found to be consequential in the onsite enactments to better determine appropriate affordance transfer, gain, and loss during online remediation. These institutions may have done the best they could in their situations, but if they considered the shifts in affordances through the dimensions of "originary technicity," industrial conditions and presentational context, they could have actively and intentionally produced object enactments that fulfilled a variety of museum goals including experiential learning and establishing an online version of authenticity.

7.1 Discussion

I began this research by asking how museum objects, practices, and mediation strategies change when remediated into a digital, networked environment of communication technologies. After detailing how these three co-actors operated to create onsite objects engagements, I then examined how the afforded possibilities and constraints of those onsite enactments were accounted for in their online remediations by tracing their object biographies up to their instantiation during the COVID-19 museum closures of 2020. Within the overarching confirmation that these enactments are indeed different and require different considerations, the examination of Live

Animal Encounter, the Online Exhibition Series, and *Time Capsule 21* led to findings about the indetermination of success in remediated enactments and a discussion about the threshold of acceptable loss.

7.1.1 Access as an Indeterminate Parameter of Success

Cultural heritage institutions found ways to continue their missions of education and collection exposure during the COVID-19 pandemic restrictions through the material affordances that digital communication technologies could offer but these online strategies were by and large overshadowed by a drive to provide so-called access to the museums. With the Virtual Live Animal Encounters at the Carnegie Museum of Natural History, the museum staff were able to continue producing a type of performance that had educational and animal enrichment components while keeping staff, animals, and visitors safe. At the Carnegie Museum of Art, the curatorial team used the forced move online as an opportunity to highlight video art–a medium that was well-suited to online broadcast–in their Online Exhibition Series to intentionally begin a renewal of its prominence within the collection, without upsetting the balance in the gallery space. And the Andy Warhol Museum was able to work within legal confines to present canonically-adjacent items from Warhol's *Time Capsules* in conversation with themes across the artist's life and work in the online exhibition of *Time Capsule 21*, and all while avoiding additional costs by using the website layout already in use by the museum.

Along the lines of standard evangelical proclamations about the innovations of computational technology and the digital age, like cost-effectiveness and collaboration facilitation discussed in the literature review, CMP pronounced "access anytime, anywhere" to online content

and resources as the main accomplishment of their online remediation efforts as a whole.[423] While access is a common trope of digital affordances, what access meant in each case, however, was unclear. Museum publications and staff did not mean access in terms of internet accessibility, the inclusive practice of removing barriers that make websites difficult or impossible to use for some users.[424] Instead, access at the CMP level seemed to only mean posting content to a web-based platform that could be digitally encountered by anyone with internet access, with little consideration for how people were meant to interact with the content. They had more of an "if you built it, they will come" attitude, which, as the research outlined in the literature review illustrated, has not been a successful approach to digital projects in cultural heritage settings. [425]

Centering this superficial notion of access as the main parameter of success was most obvious in the case of LAE. Access goals at CMNH were measured in social media terms through "impressions" and "engagement" numbers, or views and number of clicks, a phenomenon information scientist Alexandra Chassanoff notes as a penchant for thinking of "access as a proxy for use" when working with digital materials in cultural heritage settings.[426] For instance, with LAE, staff celebrated having "regulars" in online attendance, with some families joining the Zoom call almost every week, and having participants join in from around the country, although the numbers of regulars and visitors from out of state were significantly lower than their onsite figures and relatively similar in terms of their percentage of participants.[427]

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[423] "Carnegie Museums from Home," Carnegie Museums of Pittsburgh, accessed April 9, 2022, https://carnegiemuseums.org/things-to-do/museums-from-home.

[424] Shawn Lawton Henry and Liam McGee, eds., "Accessibility," W3C Web Design and Applications, accessed April 9, 2022, https://www.w3.org/standards/webdesign/accessibility.

[425] Gelfand, "If We Build It."

[426] Sperdute, interview with author, January 12, 2021. Turpin, interview with author, January 14, 2021; Chassanoff, "Use of Primary Source Materials in the Digital Age," 82.

[427] Sperdute, interview with author, January 12, 2021.

Success at AWM followed a similar conception to that of CMNH wherein the goal during the pandemic was simply to have some type of online publication related to the collections available for visitors to peruse. And, given the restrictions of foundational ownership of copyright and the staff's limited bandwidth to create an exhibit alongside their typical responsibilities, this publication needed to avoid intellectual property headaches and continued maintenance. The parameters for this project were essentially technical in nature rather than aesthetic or experiential. They were based on constrained image sizes and basic scripts that could transition into any newly designed Graphical User Interface dreamed up by the website team with minimal human intervention in future website iterations.

In contrast, at CMOA, the curatorial team relied on internal metrics for success that revolved around providing a more holistic experience of the video artworks by taking advantage of the internet's nesting and linking capabilities to develop a deeper, more layered engagement with the work. They did so through the addition of events with the artist, teaming up with the education team to develop activities that ask visitors to focus on particular aspects of the works, and increased contextualization through didactic texts. Their idea of success also meant screening works that were not commonly available online, that is providing "rare" access to the public.

Trends after the re-opening of the museums suggest that enactment creation based institutional needs instead of audience numbers and cursory publication fared better sustainability speaking. Virtual LAE were discontinued almost as quickly as they could be once the museums reopened and health concerns about human to animal transmission were quelled. CMOA, on the other hand, opted to continue their online series adding to it through a hybrid onsite/online approach. In the 2021-2022 iteration, stills from video artist Cauleen Smith's work were printed for wall-size exhibition onsite, while also offering her *COVID MANIFESTO* (2020) through the

year-long OES iteration. Although CMOA's focus has since shifted back to the larger-scale onsite exhibition schedule, the curatorial staff expressed an intention to continue utilizing their online space for video art.[428] And the *TC21* online exhibit will live on in static, yet migratable repose as intended. Such findings suggest that access is too indiscriminately understood to be used as a reliable metric for success.

7.1.2 Threshold of Acceptable Loss

In all cases, however, these measures of success generally did not take into account the material consequences of moving the enactments into a digital space. What shone through in this study was an apparent apathy, whether intentional or not, for identifying and accounting for the onsite affordances; that is, which materialities were activated in the afforded relationships in onsite enactments and acknowledging what was lost when remediated. This indifference begs the question of what exactly museums are attempting to provide access to and, more importantly for this study on online remediations of already existing enactments, what about the original, onsite enactments is being lost in the process? What is an acceptable threshold of affordance loss from the onsite enactment and how can that be determined when the layers of the original are not understood?

In the case of Live Animal Encounters, was it acceptable to lose the historical and situational context that a visitor experiences by walking through the museum and that the programming was designed to respond by adapting the programming into a detached web-based

[428] Several of the staff members involved in the creation and upkeep of the series have since left the organization leaving the continuation of the series uncertain.

application? Should more work have been put into priming the experience through the website? Should more time have been added or should the script have been changed to provide this context? In terms of the intimacy and liveness of the audience, were the static camera and position of the handler in relation to the camera appropriate choices, or would other forms of video presentation, like documentary-style shorts posted to the museum's YouTube channel, have accomplished goals that aligned more closely with the implicit and explicit goals of the onsite enactment? Could more have been done if the entire online presence of the museum did not have the marketing department as the gatekeeper?

In the case of the Online Exhibition Series, is it acceptable to lose the gallery control of the pacing and sensory aspects of video art rendering and the sculptural impact of their presentation through projection or specifically determined hardware for an at-home viewing experience on whatever personal audio and visual equipment a viewer might have? Should more work have gone into creating an enactment-specific platform with more technical awareness of how video can be incorporated online? Would providing directions that encourage a certain style of experience aid in shaping a visitor's understanding of the work or do the affordances of the medium and its history allow for such flexibility?

In the case of *Time Capsule 21,* is it acceptable to lose the sculptural qualities of the work's encapsulating and towering shelving or the archivalesque presentation of Warhol's stuff as a plethora with the meaning intended to be surmised rather than dictated for a linear, thematically parsed scrolling website? Should the capsules receive more contextualization as a whole serial work rather than separating the whole into parts using a system of archival hierarchy? Should the online presentation allow for both levels of understanding similar to the onsite version? Or should it be placed more firmly in one set of practices or another?

My line of questioning in each case demonstrates that there were numerous affordances shifted between the onsite and online enactments that had not been obviously accounted for if at all. Some of the apathy surrounding these affordances can be justifiably attributed to the time in which these digital remediations occurred, a time when fear and exhaustion from a worldwide pandemic gripped the human psyche, financial and personnel resources were withheld, and expectations for online engagement rose exponentially without warning. Yet, such indiscriminate affordance consideration hearkens back to the hesitancy of providing digital exhibitions and programming that prompted this research.

7.2 Recommendations

My arguments in favor of defining remediation success through sociomaterial transfer or through an actively negotiated repudiation of transfer and the need to determine thresholds of acceptable loss are premised by three related considerations: 1) The use of digital communication technologies for museum object remediation is a common practice that will continue, 2) current practices in cultural heritage institutions for remediating museum objects disregard or inappropriately regard the sociomaterial affordances that constitute both onsite and online enactments, and 3) negligence of sociomaterial affordance transfer and loss leads to unsuccessful remediations in terms of explicitly determining relationships with their onsite enactments. My recommendations that seek to fulfill the terms of these arguments and considerations are based on a cross-case comparison and synthesis of the sociomaterial affordances found in each of the cases studied in this dissertation.

I recommend conducting an acceptable loss survey at the outset of a remediation project that marks affordances found in the onsite object enactment for consideration during digital remediation across several aspects. Inspired by the arguments of the Socio-Technical Sustainability Roadmap project at the University of Pittsburgh that choices regarding digital projects "are best pursued as intentional plans rather than surprise happenstance," this recommendation provides guidelines for intentional sociomaterial choices during enactment remediation through affordance identification.[429] Although more research needs to be conducted into the specifics of consequential features, as will be discussed in future directions for this work, the findings from this study suggest three dimensions of enactment that need to be accounted for in this survey: the originary technicity of the object, industrial conditions, and presentational context (Figure 19). These overlapping, sometimes revealing, sometimes concealing layers emerged during the case studies as consequential aspects of each enactment.

Figure 19 Sociomaterial Dimensions of Object Enactments.

[429] Visual Media Workshop at the University of Pittsburgh, "The Socio-Technical Sustainability Roadmap," accessed June 30, 2022, https://sites.haa.pitt.edu/sustainabilityroadmap/getting-started.

Originary Technicity: The first component, that of originary technicity, refers to what the objects themselves bring to the enactment. The term "originary technicity" is a Derridian-derived term in reference to the "mutual co-constitution of technology and human."[430] The idea is part of the long tradition of thinkers who have criticized the Artistolean subject-object dualism that supposes technologies as merely instruments at humanity's behest in favor of deconstructivist and posthumanist positions about how technologies and humans shape one another. I use this philosophical concept here to emphasize that museum objects are co-constitutive insofar as we, or at least our practices, are shaped by them and they shaped by us, and this relationality can be examined across two facets of the objects.

The first aspect is the essential properties or the properties of the objects that support the persistence of identity across situations. Here, essential properties are those that cannot be removed without the thing in question becoming a different *type* of thing as opposed to nonessential properties that may exist but are not required in that type (e.g., a dog is a domesticated carnivorous mammal in the Canidae family are essential properties, but a dog having or not having a tail is nonessential). The second aspect of originary technicity, as I employ it here, is an object's significant properties or the properties "that affect quality, usability, rendering, and behaviour," which could be anything from their color or texture to byte-level encoding and logical schema depending on the object under consideration.[431] Referring to both essential and nonessential

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[430] Federica Frabretti, "Have the Humanities Always Been Digital? For an Understanding of the Digital Humanities' in the Context of Originary Technicity," in *Understanding Digital Humanities*, ed. D. Berry (London, United Kingdom: Palgrave Macmillan UK, 2012), 162; Jacques Derrida, *Of Grammatology*, trans. Gayatri Chakravorty Spivak, Fortieth-Anniversary ed. (Baltimore: Johns Hopkins University Press, 2016); Richard Beardsworth, "From a Genealogy of Matter to a Politics of Memory: Stiegler's Thinking of Technics," *Tekhnema 2* no. Spring (1995), http://tekhnema.free.fr/2Beardsworth.htm.

[431] Margaret Hedstrom and Christoper A. Lee, "Significant Properties of Digital Objects: Definitions, Applications, Implications," in *Proceedings of the DLM-Forum 2002: Access and Preservation of Electronic Information*, ed. Peter Berninger, Frank Brady, Hans Hofmann, and Jef Schram, 218-223 (Luxembourg: Office for Official Publications of the European Communities, 2002).

properties, I borrow "significant properties" directly from digital preservation and archival researchers who are concerned with the phenomenological and evidentiary fidelity of digital objects. By recognizing what properties are essential to the objects' identity and how properties of the objects are significant for particular settings, those who wish to enact said objects will be better equipped to make decisions about remediation strategies.

Industrial Conditions: The layer of industrial conditions refers to the state of the industry in which the object became musealia, or the industrial conditions and processes that "extracted [the] thing, physically or conceptually, from its original, natural, or cultural environments and providing it with museal status," as well as the state of the industry during remediation.[432] This includes matters of best practices specific to object types and remediation strategies, the technologies available to collect, store, and enact those objects, and more localized issues of leadership buy-in and collaboration potential/departmental silo-ing. For example, dead animals became museum objects in tandem with the concept of a natural history museum under a banner of imperialism and dominance in the case of LAE. Dead animals were then collected and displayed at an alarming rate due to the technological and ideological demands of the scientific pursuits of the 1900s and denaturalized to educate visitors through constructed versions of museum natures. The living animals were eventually brought in as both a continuation of these concepts and in contrast to the dead animals as denaturalized spectacles of life. Their enactment in LAE depends on these industrial notions for their meaning and their existence in their pre-pandemic, onsite iteration.

Presentational Context: To examine the layer of presentational context, one would need to examine the conditions surrounding the object(s). This includes what efforts have been made,

[432] *Key Concepts of Museology*.

either intentionally or accidentally, to prime a visitor to the enactment, that is to shape a visitor's response to stimuli by exposing them to concepts and relationships between them that are then stored in that person's memory for future accuracy and bias responses.[433] A concept discussed heavily in psychological research about adaptive memory, the primed responses combine with the life experience of the visitor to become a frame of reference for subsequent reactions, feelings, and information capture. For example, the chronological unfolding of human-animal relations through a scientific lens positions the LAE enactment within that history while the more isolated, sparse surroundings of the OES encourage the viewer to try to understand the works within their own, very specific contexts instead of the institution's context. Online, these two works had almost the inverse priming wherein the Virtual LAE was located in an informational abyss and while OES had added interpretive and descriptive contextualization.

The presentational context also refers to how the objects are located and presented among other objects and features during programming or exhibition. Considerations in this vein that were noted during the case studies were the shifting levels of control on behalf of the institution and the viewer, the personalization of the experience, and the degree of liveness, or immediacy of the enactment. It is here that one should examine how mediation strategies make themselves known or recede into the background while shaping the object interaction. It may be profitable in this layer to develop an understanding of how the objects or objects like it have been presented before, what relationships were present during those enactments, and how they compare to the affordances

[433] Jesse Marzyck, "The Adaptive Significance of Priming," *Pop Psych* (blog), *Psychology Today*, January 22, 2017, https://www.psychologytoday.com/us/blog/pop-psych/201701/the-adaptive-significance-priming; Richard N. Henson et al., "Stimulus–Response Bindings in Priming," *Trends in Cognitive Sciences* 18, no. 7 (2014): 376-384, https://doi.org/10.1016/J.TICS.2014.03.004.

already present at one's institution. Through a combination of these layered dimensions of object enactment, museums will be better equipped to remediate museum object online.

7.3 Future Directions

In this study, I applied the Biographies of Artifact and Practices approach to investigate sociomaterial affordance shifts during online remediations of three enactments. Through this research, I provided rich descriptions of how objects and practice shape one another as they move through time, space, and technology. These descriptions may not have quelled any reservations about the sustainability, usefulness, or meaning of digital projects, but they did form the basis of an intervention survey strategy that acknowledges how sociomaterial affordances shift during remediation. Some directions for future research respond to the limitations encountered during this study such as a research design that allowed for depth but not breadth, and the challenges of studying the relational practices during a worldwide pandemic, while others bring a similar methodology to studying the sociomaterialities of other types of enactments.

More research needs to be conducted to confirm the validity and fine-tune the layers of my recommended survey through a larger and more diverse sample size. Such a variation, while maintaining a similar methodological depth, might include the study of multiple object types in one type of institution or the same object types (or objects from the same series) across institution types. The latter could expand or transform the investigation of sociomaterial affordances to one of boundary objects, "objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across

sites," which would add a different perspective for identifying loss across contexts.[434] There is also an opportunity for creating a higher-level research instrument to conduct a broader study to measure the scope and extent of affordance loss.

My approach provided insight that shaped recommendations for how to move forward, but it operated mainly at the level of the general public interface for the enactment, specifically examining Graphical User Interfaces and the average hardware components of a personal computer set up from fairly surface-level understanding. While helpful for placing this research in the perspective of the museum staff who worked within these interfaces, more research needs to be conducted on the affordances of the technologies themselves and the practices of the professionals that co-constitute the technological basis for these enactments. On the other end of the expert/novice, administrator/user spectra, there is also a gap in understanding the user experience across the mediation strategies that require more insight. Additionally, I would like to study how these layers function in other "distanced" object enactments through non-digital, offsite mediation strategies like Museum-to-Go, museums on wheels, and in classroom settings. Strategies used in those settings might be transferable to a digitally remediated space and vice versa.

[434] Susan Leigh Star and James R. Griesemer, "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39," *Social Studies of Science* 19, no. 3 (1989): 393, http://www.jstor.org/stable/285080.

Appendix A Observation Briefing Form with Guidance

Enactment:	Online/Onsite
Date:	Location: *[physical space or url]*
Setting: *[What is the institutional layout? How are the spaces leading up to the enactment designed? What are the immediate surroundings of the enactment?]*	
Object(s): *[What is the position of the object? How is it situated and displayed among its surroundings? What do you see, hear, smell?]*	
Activity: *[What types of movement through the space and engagement with the object are possible?]*	
Staff Interactions:	

Enactment:	Online/Onsite
Date:	Location: *[physical space or url]*
Setting: *[What is the institutional layout? How are the spaces leading up to the enactment designed? What are the immediate surroundings of the enactment?]*	
Object(s): *[What is the position of the object? How is it situated and displayed among its surroundings? What do you see, hear, smell?]*	
[If you spoke with any staff in the area, what were their titles and their familiarity with the object? What did they say about the objects or their enactment?]	

Appendix B Semi-Structured Interview Questions

- What was your role in the creation of the onsite [object enactment]? What was your role in the creation of the online [object enactment]?
- Are you regularly involved in projects like [object enactment]?
- Is there a standard process for creating [programming/exhibits/resources] like [object enactment] at [interviewee's institution]?
- How do you/your institution determine the success of these projects?
- Can you walk me through what you know about the process of creating [object enactments]?
- Is this different or similar to other digital projects you have worked on? How? Did any processes or strategies change because of the Covid-19 closures?
- What challenges or opportunities stood out when working with these objects in a digital space?
- How did you anticipate access to [object enactment]? Did you have particular visitors/viewing settings in mind?
- If you could do it all over again and/or had complete control of the process, what, if anything, would you do differently and how?

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