New…Now?
Or Why a Design History of
Coin-op Video Game Machines

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The author asks what has occurred in game history scholarship to warrant the use of the adjective "new" in "New Video Game History" and suggests an awareness of process may now be influencing the study of games. In support of this observation, he organizes the article along two interrelated fronts. The first speaks to the on-going process of collection development at cultural institutions while the second addresses a shift in how game history is currently being written. The latter, he argues, demonstrates why we ought to consider carefully what "new" might signal for the critical historical study of games. At length, the article concludes by making a case for turning to design history to write a historical study of Atari's coin-operated machines. **Key words**: Atari; coin-ops; design history; graphic design; game history; industrial design; New Video Game History

CRINGE WHEN I SEE the adjective "new" affixed to subjects like media, materialism, museology, heritage, art history, or cultural history. I much prefer to think about paradigm reconstruction as a sensitivity or sensibility in need of further assemblage to better comprehend an intellectual problem or particular moment rather than invoke a word with so much ideological cargo as in "New World" let alone branding power—think laundry detergent.

Certainly, in academia, new as a modifier seldom travels alone. The opportunistic "studies " quickly sneaks up from behind so that, for example, in the early 2000s, we had to scratch our heads over what "new media studies" actually meant (at least those not satisfied with the answer "digital" did). The word new harbors loftier goals. We often now expect an object bestowed the status of new to become an academic field, at least a subfield. We gift it with introductions, readers, dictionaries, and journals. Voila! Centers, departments, societies, degrees, graduate students, professional positions, all spring up (not to mention big bucks for academic publishers). Luckily for those of us taking stock of the

scholarly study of game history, the *American Journal of Play* has nothing so grandiose in mind with its themed issue on the subject.

In lieu of pinning the word "studies" to "new video game" we are offered the word "history." How then are we meant to read this? Do we regard it as an idiom? Is its meaning axiomatic? Does it hold the status of an appellation? Is it a new maxim for a distinct type of historical research? A conviction? A different involvement with the history of video games compared to something we can identify as *old* video game history? Or perhaps the phrase is nothing more than a lesson in periphrasis? Do we examine each word etymologically and in relation to one another to debate the phrase's collective meaning? Is history some form of suffix applied to the phrase "new video game" with the aim of shifting its meaning or value? The shift in that sense would be that new video game points to an emergent techno-cultural form and that the addition of history is meant to account for this momentous rupture warranting an altogether fundamentally different historical consideration for an altogether different object. But surely any historian would balk at such an absurd suggestion and challenge any assertion that a phrase like "new video game" encapsulates only today's video games to remind her or his audience that, as Lisa Gitelman and Geoffrey B. Pingree did so well in their introduction to *New Media, 1740–1915* written over a decade ago, "all media were once 'new media', and our purpose … is to consider such emergent media within their historical contexts—to seek out the past on its own passed terms."[1] I agree wholeheartedly.

My sense here is that the mysterious New Video Game History has less to do with specific, game-related artifacts or even with budding topics of inquiry than with *how* scholars of game history now conduct their research and what they write. My eyebrows fail to rise with the wording video game history. The phrase is no stranger to common parlance, a phenomenon to which my jam-packed bookshelves evidence in their amalgamation of the subject (more about my bookshelves later). My eyebrows do, however, form a quizzical arc and my reading glasses slide further down my nose when the word "new" elbows its way into video game history. The once familiar now demands careful intellectual footing to avoid triggering all of the troublesome encumbrance proffered by the new. Best to tread lightly here. I also sense that the word "historiography" is implied by "history" so that the "new" assigned to video game history becomes a conversation about the myriad practices of writing game histories accompanied by the act of writing about game history writing, an evocation of research and composition of historical discourse on video games. I will

indulge this sensation. Ergo, my article asks not what is New Video Game History but what has happened to game historical writing and research to warrant the descriptor "new"… now?

To hit this question head on, I treat New Video Game History like one of Marshall McLuhan's probes pushed out into the world for those captivated by the historical study of video games to make sense of, to describe and debate, and ultimately to adopt or reject. McLuhan designed his linguistic probes (e.g. "the medium is the message") as exploratory devices to enhance awareness. Their aim, as W. Terrence Gordon explains, is "testing the forms and limits of an idea."[2] Let us treat New Video Game History as such a device, a means to seek out the observable changes now affecting the writing of game history not from the vantage of any suprahistorical perspective, not from the confidence gained from an emergent, homologous school of thought, or not even from the assurance that such a probe will yield a consensus from its efforts. Its audacity in particular affords an opportunity for such an exploration, and perhaps you, like me, cringe at the possibility of the phrase itself or roll your eyes at yet another "turn" emanating out of the humanities and social sciences. Perhaps you applaud its very presumptuousness or feel that it is long overdue. Or maybe you choose to ignore it altogether. Pick the response that fits best. But let us neither rush to any hastily drawn conclusions nor impose an ultimate meaning on our probe. Leave it unresolved while we test what it may offer with a closer inspection of the recent past and histories written about it. I embrace the uncertainty our probe affords, especially if part of its design is to unsettle the figurative grounds that have long supported the writing of game history.

So, I ask again: What has occurred in the research and scholarly writing of game history to warrant "new"… now? Here is my take: the probe New Video Game History suggests an awareness of process affecting the current study of video game history. I mummer this response based on my observations on two interrelated fronts. The first speaks to the on-going process of collection development at cultural institutions while the second addresses a shift in the writing of game history that marks a distinction from predominant forms of game history writing. The latter, I believe, demonstrates best why we ought to consider carefully what new might signal for the historical study of games.[3] By way of an extended conclusion, I discuss why I have turned to design history and what design history can offer to the historical study of games. Finally, I contend that much can be gained from a union between the history of games and design history.

Era of Collection Revisited

I have claimed that an era of collection has followed what Erkki Huhtamo once labeled an "era of chronicle" to demarcate the historical surveys accounting for the bulk of historical writing devoted to video games.[4] I will not rehash the litany of works that composed the era of chronicle or offer additional examples to fit Huhtamo's criticism.[5] My claim for the category of era of collection neither insists that institutional collections draw a curtain on the writing of descriptive historical chronologies (for they still constitute large chunks of game history writing) nor highlights the notable efforts of specific institutions actively collecting and supporting public research. Instead, I mean to convey a general ethos of the need to document and preserve the recent past with video games that have become particularly vulnerable not only because of technological obsolescence and fragility, but also due to IP restrictions, game industry ineptitude in establishing or maintaining archives, and a paucity of materials publically available from game companies.[6]

This new ethos, I note, has come about as members of the games industry acknowledge their personal materials are of great value to cultural institutions and to those researchers using such collections (something I personally benefit from when former Atari designers share materials they've had stashed away for more than forty years). It accounts for (some) private collectors now parting with their revered materials—via donation, auction, or direct sale—as well as for those willing to grant public access to their collections in small, privately owned museums, individual homes, and personal storage facilities, or offering digitized versions of objects uploaded to a website (e.g., arcade flyers).[7] Lastly, such an ethos even stretches to researchers. At present researchers are not only aware that video game collections exist at the Computer History Museum, Smithsonian National Museum of American History, Stanford University, The Strong, and the University of Texas at Austin, to name a few U.S. institutions, but are actively using such collections to shape the histories they write.

This certainly widens who can write video game history. Previous efforts benefitted from exclusive access to private collections or through direct connections to the game industry (not always easy to achieve), or come from writers who composed their histories from materials available to them and only them. The absence of accessible collections and the archival materials they provide still casts a shadow over the reliability of many current histories. How were they written without such materials? Are primary sources limited

to magazine advertisements, company catalogs, and PDFs of the Sear's Wishbook? Was research more a result of dumpster diving and flea market picking than of institutional visits? Can interviews alone suffice? Are such interviews made available for public inspection? Were some histories solely reliant upon an author's memory of a particular period and on personal experience (I played *Pac-Man* in an arcade back in 1980, therefore I am a historian)? Lastly, can biography be an exclusive source of historical research, a master narrative of irrefutable truth?

Writers of game history now have access to materials that were previously unavailable, lying in the domain of private collectors or locked away in garages, attics, or the memories of former game industry employees. Access will, in a highly productive and maybe even provocative manner, help construct further criticism of existing claims made about the history of games and enable the writing of new arguments about how we know the past.[8] I will add myself to this group of users, one fortunate to have curators, librarians, and historians actively selecting materials from which to conduct historical research. A book that I am currently researching entitled, *Atari Modern: A Design History of Atari's Coin-Ops, 1972–1979*, relies heavily on access to the Steve Bristow collection held at Stanford University, and The Strong's Atari arcade design collection, covering the years 1973 to 1991. Quite simply, without such collections, this history of Atari's industrial and graphic design process could not be written as an exercise in scholarly research.

Bristow's papers resided at his personal residence spread across garage, makeshift basement, and office before being gifted to Stanford University.[9] The Strong's collection of industrial design documents, composite sketches, company memos, marketing reports, promotional materials, video and audio recordings, and photo-mechanicals baked in storage facilities in Chowchilla, California, before being acquired from a private collector. In *Dust: The Archive and Cultural History,* Carolyn Steedman writes about the stillness experienced by "stuff" housed in an archive. "It just sits there," she explains, "until it is read, and used, and narrativised."[10] Of course the administrative processes of an institution are a form of narrativization as collection appraisal, transportation, acquisition, processing, conservation, documentation, cataloguing, storing, retrieving, displaying (if applicable), copying, and reshelving divest objects of their quietude.

Given my interests in objects as they move across their life histories, I cannot help but ask: what about this stuff, so meaningful to me, before it even traversed the thresholds of Stanford University or The Strong? It aged in neglect. Paper yellowed with corroded staples. Film negatives fused with their protective

plastic membranes. Mold grew. Water damaged some materials crammed into a filing cabinet. Other artifacts were left to deteriorate in rotting wooden cabinets. These materials went unused too. Their presence as stuff—never meant for our eyes to glimpse, as Steedmen reminds us—served only to evidence the career of their owner, as in the case of Atari/Key Games Vice President of Engineering Bristow (who passed away on February 22, 2015), or they lost their former meaning altogether for their collector once they were padlocked in nondescript storage lockers that placed them out-of-reach, and the one-time intimacy of ownership, the thrill of acquisition, had become a costly burden.

Walter Benjamin felt that the meaningfulness of objects was lost once they were removed from the care of their personal owner and publically displayed in a museum, which deflated the enchantment of the collector's magic circle. But institutions actively collecting materials to help document the history of video games perform their own rescue operations so that this stuff lives anew while the labor of research—with an intimacy and magic circle of its own—bestows a different set of meanings and values onto the fate of these previously neglected materials.[11] Their life history continues as they enter into a new situation: their institutional life is now part of their history, part of our history writing. "There story takes shape," Arlette Farge stresses in her beautiful little book, *The Allure of the Archive*, when writing about the emotional pull of working with archival materials, "only when you ask a specific type of question of them, not when you first discover them, no matter how happy the discovery might have been."[12] Our task is to stir this stuff with our questioning touch.

Much as I regard the era of collection central to the conversation about New Video Game History, I do not accept that access alone—though an irrefutable advantage gifted to researchers by libraries, archives, museums, databases, and those private collectors willing to grant it—sanctions this probe. The labor of historians in general and across fields is premised upon performing continuous interpretative and methodological actions on materials housed within collections.[13] Additionally, working with such materials benefits from professional training in theories and methods. If access—in all of its archival intimacy, intrigue, fascination, frustration, restriction, tedium, exhaustion, and even banality—were offered as the lone response to our probe, then the question concerning New Video Game History should have been asked long before 2017 and is easily answerable today by the industrious efforts of official and nonofficial collections that select and safeguard materials for researchers and posterity. Do be assured, though, that something new is at work here. Research-

ers have materials to work with that were unavailable to them previously, and such materials are new to the discourse of game history: valued and treated as historical documents by institutional appraisal and official practices (e.g. deeds of gifts, letters of understanding), collection management, archival and curatorial processing, and, most notably, the diverse workings of historical analyses texturing materials held in such collections. The phrase "awareness of process" accounts for these invaluable efforts when attempting to understand our probe. There is, however, more to it than what is stored in an acid-free box. Such materials certainly pique our awareness, help construct and document our arguments, shape the claims we can make, evidence a past, and make the books and articles we wish to write possible, but cultivating such an awareness is dependent on the questions, disciplines, and methods of historical research brought to the table in conversation *with* what rests upon it.

(Critical)[14] Game Historiography

"Awareness of process" is also found in McLuhan's writing.[15] The phrase, in its high modernist splendor, accounts for the importance of studying the effects of media to understand their involvement in transforming experience, and shaping new environments, as opposed to restricting our definitions of media to that of transporter of content. McLuhan was interested in form, and he accepted this tenet as "more significant than the information or idea 'transmitted.'"[16] In studying any medium we are left to ask not for its meaning but what it does, to contemplate the effects of its processes to help determine how it enables specific habits (e.g. print culture encouraged structure, order, linearity). This allowed McLuhan to write many (questionable) lines like: "The effect of radio on literate or visual man was to reawaken his tribal memories, and the effect of sound added to motion pictures was to diminish the role of mime, tactility, and kinesthesis."[17] It is not necessary to adopt fully McLuhan's thinking here or to delve further into his works. With a light touch we can direct this emphasis on form to our probe. This does not imply that content plays no role in shaping the form historical writing may take. Rather than dwell on the content of the historical study of video games, let us consider the forms the writing of game history has taken and the effects such writing may produce.

My slight detour through McLuhan arrives at a general position in historiography, though it ought to be noted, one rarely visited when writing video

game history. Hayden White, long interested in the literary qualities of historiography, has written on the "possible forms of historical representation" since the 1970s and, in subsequent works, has acknowledged what he calls the "double representation" of historical discourse, whereby we have the object of a historian's interest—the stuff sitting quietly in archives per Steedmen—as well as "the historian's thought about the object."[18] Production of such historical discourse, White writes elsewhere, involves "interpretations of whatever information about and knowledge of the past the historian commands."[19] It is the game scholar's attention to the (tropological) form of her or his historical interpretations along with adherence to historical traditions (more often than not, interdisciplinary and multidisciplinary) that elucidates an awareness actively reshaping or transforming the *environment* of video game history—this word, also common in McLuhan's lexicon, seems much more fitting than field or subfield given the space bestowed upon game collections in cultural institutions conjointly with spaces recently attributed to game history in themed issues of journals,[20] academic presses,[21] conferences,[22] and social media user groups[23] along with the subject being welcomed into professional scholarly organizations long invested in historical study.[24] We should note that not only are scholars trained in historical research writing game histories or about game history but also that they are scrutinizing their own history-writing process. They are producing a critical evaluation of their subject, historiography, theory, and method as they actively consider the support as well as limitations of the research materials available. Writing of this variety does not only produce histories of games but applies a critical lens to the techniques of composing its history. Simply put, such writers utilize the research of historians and historical methods to construct their history.[25] These discerning eyes produce not only better histories of games but also valuable critiques of the composing of history, reflective of subject matter and materials along with how they can be convincingly and astutely composed into narratives of game history.

This may seem an anticlimax to my invocation of an awareness of process. Being aware of the form one's historical writing takes is standard in historical scholarship, and it is of utmost importance that such an awareness become standard in the historical study of video games. I do not pretend that this is a profound or radical observation . On the contrary, its obviousness gives meaning to the use of "new" to describe such history.

I have found that the process of writing history, or considering its form, is rarely, if ever, attended to by those professing to write game history. The

self-conscious writing of history and questioning why specific forms of historical writing are necessary to construct the history of a particular subject are absent in much game history.[26] One might ask why even raise such an expectation considering that so many of those who wrote about games were neither trained historians nor familiar with the methods of historical analysis? We know that game histories have been mostly the works of journalists, enthusiasts, collectors, contributors to game magazines, free-lance writers, and a few academics (without vested interest in historiography). Regardless of cultural tradition, writers of popular game history did not scrutinize their particular form of historical writing : they partook in the imagined naked act of writing "history itself." This is not in itself a problem for popular accounts, but when such accounts alone constitute the history of games, history itself becomes treacherous as truth claims and excessive digging up of facts collect on wet roads like autumn leaves. Such popular histories do not distinguish between the historical past as an active construction (qua White and others) from the writing of history as an action devoted exclusively to recording past events. Theirs is an unprocessed history accepted and written as natural, organic, raw, with the task of these historians being limited to recording inert facts.

In these cases, the erudition of writing history never becomes transparent. A questioning of sources, of the subject and philosophy of history, or of the process of research never occurs. The inclusion of other histories—wrestling with the labor of other historians—within one's work is rare (as are full citations). This kind of historical writing regards the act itself not as a form of mediation but one of conveying how something "really was." It tries to realize what really happened in often painstaking treatments of particular cases, sometimes recounted year by year. Certainly, this way of writing game history, by way of the metaphors I used above, seems healthier in our contemporary swirl of kale smoothies, cage-free eggs, and almond-milk lattes. Nevertheless, this form of writing history is also heavily processed even if unaware of its own process. The superstition of fact is all that this form of historicism can offer on its limited diet. Such descriptive and fact-driven works have little room for further development in game history. The effect? Constant discovery of ever more unaccounted-for facts overlooked by previous histories, endless fact checking and corrections, and a persistent penchant for coverage. Historical writing of this flavor can only rely on the updated volume, the expanded second edition, or the retrieved minutia that constitutes the so-called "complete account" or "real history."

Another way the bulk of these game histories contrast to what I hope a category like New Video Game History seeks to cultivate is that most of them

seem uninterested in modest accounts: they all want to declaim the historically epic nature of their tales. Surveys of global histories, the history of a nation's games smuggled into a lone chapter or article, histories of game companies that span decades (e.g. how many "complete" histories of Nintendo now exist?), or a "from-to" measure that fills in all the gaps with temporal markers typical in scale and scope of epic emplotment. Depending on origin narrative, many of them use as a plot device a specific beginning—typically, say, *Tennis For Two*, *Spacewar!*, Magnavox Odyssey, *Computer Space*, *Pong*—and then attempt to cover fifty years in a single study. This epic style has thus far constituted much of the writing of game history with only a handful of exceptions. The coverage required by the writers of these histories leaves little room for an engagement with the process of composing history.

The take away from the prevalent generation of game historical writing is that milestones have been established (e.g. Ralph Baer's Brown-Box prototype). A canon of games deemed worthy of historical study has formed with certain game designers hailed as revolutionary. Temporal markers have been declared (e.g., precrash and postcrash eras), tropes solidified into general knowledge (e.g. console wars), a terrain mapped out supporting something that can be labeled "video game history" as opposed to other types of histories. The achievement of histories written by this generation is that they have successfully stimulated more historical writing on video games.

If an awareness of process has been absent in this game history and if the epic tale has become dominant in game history writing , then one justification for using the adjective "new" to distinguish a change in video game history may be that different models for how game history can be constructed are emerging that do not look like these reigning forms.[27] At the risk of being reductive, I will say that contemporary game histories abandon the epic for interstitial particularities. Two examples are projects by Melanie Swalwell and Jaroslav Švelch, who offer an awareness of historical analysis and method (oral histories, interviews, materials researched at traditional and nontraditional archives) in their respective studies and who anchor their histories to specific places (microcomputer home brew practices in New Zealand for Swalwell, and for Švelch amateur computer clubs in former Czechoslovakia) and time periods (primarily the 1980s for both). Thus their social histories eschew the generalist survey that proliferates in epic histories.[28] In doing so, however, neither loses contact with larger questions pertinent to the critical historical study of games from the perspective of our present. They both manage to theorize on micro- and macroscales, and their analytical

investments and historical research are not limited to highlighting the games of a specific era or region but to configuring them in the much broader contexts of everyday life, politics, transnational and local history, cultural practices, and social relations with technology.

I cannot stress how important this kind of writing may prove for the critical historical analysis of video games. Consider Lynn Hunt's introduction, now a classic for the field of cultural history, to the collection, *The New Cultural History* (1989), which forewarns that a "cultural history defined topically could degenerate into an endless search for new cultural practices to describe."[29] Until now, the history of games has been a history of, well, exactly that: histories of games, a few companies that produce them, developers that design them, and, more recently, considerations of the platforms that run them.

Game historians with an ear to the door of science and technology studies and the history of technology now cite concerns over inventor-centric or innovator-centric narratives that overdetermine game history, but I would also cite the pressure of the game-centric narrative that has proven equally restrictive. Video game history must not be about only video games. This leads to what Laine Nooney designates as "the itemization of particularly epic moments in the 'evolution' of game play"[30] (and, I would also add, the evolution in software design). In place of ever-expanding topics of inquiry injected into the practice of cultural history, Hunt urges for the development of a "sense of cohesion or interaction between topics."[31] Situating a game or games into a historical narrative can serve as a material referent from which to conduct a wider analysis, one with an eye to understanding contexts (even unforeseen ones), establishing and explaining relations between phenomena and practices, as well as drawing connections otherwise elusive without the prism of video games.

What I read in our probe is that game history hovers on the verge of a different wave of much more critical scholarship with research focus, theoretical grounding, and methods aligned to produce cultural, social, feminist, queer, material, technological, business, user, transnational, and local histories to advance our understanding of video game history and historiography. Key here, and perhaps this will provide the "cohesion" for game history that Hunt deems invaluable to her field of study, is that diverse historical traditions—their methods, theories, debates, intellectual histories, teachings—are being brought to bear on the reshaping of video game history. This is less about filling in gaps, writing about forgotten games, or redeeming those that have been overlooked than having a larger toolbox from which to reconstruct game histories.

Why Design History

To begin this article's long conclusion (inconclusion may be more fitting), I wish to muse on my own contribution to what we might adopt as "critical historical studies of games"[32]—a much more palatable means to punctuate the observable differences currently informing the construction of game histories. When hours of writing drains productive thought that not even generous cups of Yorkshire Gold tea can replenish, I often find myself staring hopefully (or desperately, pending the situation) at my bookshelves for renewal. It is not necessarily their content that I seek but the constellation their organization forms. Shelving does not factor prominently in Walter Benjamin's short essay on book collecting. It is the books and the tales of acquisition they rekindle that captures his interests most—gleaned in the moment (and the mood) of reunion with their owner as they lie still in a state of disarray, "not yet touched by the mild boredom of order"[33] that their placement on shelves or inside a book case will inevitably create. Alas, disarrangement proves brief. One's treasured objects cannot remain outside of the habit, maybe the habitat, of order for long before taking their (disciplined) place within an organizational system that helps bring meaning to a collection. The inspiration I gain when I stare at my shelves finds a parallel in the conceptual frames (molded polypropylene orange) that help define my personal take on game history. You might say that I am less enamored at the prospect of unpacking my library than reconfiguring my shelves.

In the seedling years of *Game After*, around 2007 to 2008, I gifted myself with a Cubitec Shelving System from Design Within Reach.[34] This expandable modular structure configures how I do game history. I used to arrange books into author sections (e.g. McLuhan, Foucault, Benjamin, Latour, Ihde) as well as subjects (e.g. cultural history, media theory, material culture, game studies). This classificatory system felt constrictive for the research project that eventually became *Game After*. Subjects, concepts, objects, authors, methods accumulated in the lengthy span of research defied easy placement into the existing order, or they consistently necessitated reorganization as some subjects bled over onto nearby shelves, while others, once significant, were abandoned altogether. I reconfigured my bookshelves to support a living biography for *Game After* and the project's research interest in the materials used to document and evidence the past and from which to write game history.

The shelving's interlocking cells became epistemological architecture for the object its structure would eventually produce while continuing to structure

my current project, *Atari Modern*. This latter project's underlying premise is that we know a great deal about game design *as* software and hardware development but less about the industrial and graphic design processes and people responsible for the shapes and styles of Atari's coin-op cabinets that, as the book aims to demonstrate, played a constitutive role in helping define the product, situated and domesticated a new medium into an existing market place, supported interaction between user and machine, and introduced transformative design paradigms into the everyday visual and material culture of the 1970s. I have turned to design history and the history of design because questions pertaining to industrial, interaction, and graphic design cannot be sufficiently explored by game studies, game design, and game history's current areas of concentration. I have learned from former Atari industrial as well as graphic designers interviewed for my book that a great deal is known about games but little about the artifacts *designed* for their play.

The mosaic supporting the writing of *Atari Modern* is formed by the interlockings of design history, design culture or design studies, history of technology, science and technology studies, material culture studies, cultural history and social history, museum studies, media history, visual culture studies, and the nebulae we call theory and philosophy, which do not, I stress, rest comfortably in separate cubes but spill over. For me a New Video Game History lives not in orderly shelves but in this disarray of complicated configurations (figure 1). On my shelves, to share the contents of one cramped cube I have just visited, you will observe unfiled archival documents pertaining to Atari's industrial design division resting on *The Poetics of Space*, *Networks of Power*, *Reassembling the Social*, *The Seven Lamps of Architecture*, *Heidegger's Technologies: Postphenomenological Perspectives*, *Theory and Design in the First Machine Age*, *Design for the Real World*, *Theory of Colors*, *Industrial Design: Reflections of a Century*, *Experimental Phenomenology*, *Where Stuff Comes From*, *Dust: The Archive and Cultural History*, *The Democracy of Objects*, *Learning from Las Vegas*, *Does Technology Drive History*, *Designing Things*, *American Genesis: A Century of Invention and Technological Enthusiasm, 1870–1970*, *Designing Interactions*, *The Shock of the Old*, *The Industrial Design Reader*, *Make It New: The History of Silicon Valley Design* and various issues of *Block*. Writing a design history of Atari's coin-op cabinets requires the contents of this singular cube and others like it along with the entire field of relations such mixed-disciplinary work engenders in order to open up new questions and to address problems that are far from possible within the present confines of game history.

Figure 1. One of the author's bookshelves. Photo courtesy of the author.

I offer my final sections in the form of four statements that begin to explain what design history can bring to the historical study of games. Such statements ought to be read as conceptive observations that I feel are warranted even at this early stage of my project, when crucial archival documents are filed but are still being actively interpreted. In fact it is very fair to say that

these observations are what propelled my interest in pursuing this project in the first place.

Coin-op Video Game Machines Are Complex Artifacts

Many views can be applied to a machine's cabinet to reveal its multiple functions. I prefer the word "machine" to the more common term "game" to account for the entire material apparatus with its many components. Before we even arrive at the machine's game, or perhaps even simultaneously with its development process, we may begin with the view of the cabinet as a concept (figure 2), one sketched by industrial designers with colored pencils and markers (CAD was not used at Atari until around 1982). Form, shape, graphics (if present), materials, and imagined human users are rendered to conceptualize the design of the cabinet. Sketches are then evaluated, redrawn and approved. Foam core mock-ups are built. Assembly drawings are drafted and revised many times. Materials are priced. Prototypes are constructed by the model shop. These are then reviewed by managers of different divisions including sales and marketing. More revisions are made if needed. Cabinets are stuffed with their electronic and mechanical components. Prototypes are field tested. Focus group feedback prompts further revision. Once finalized, a cabinet goes into production. Cabinets become a container to safely store and support electronics—not just printed circuit boards and a monitor but also the machine's power supply, the mechanicals of the coin door and cash drawer, harnessing, assemblies for speakers, and the control panel. In its function as container, the machine's cabinet must also be reinforced by a solid plywood front panel and accompanying locking mechanism to make it durable, safeguard its earnings from theft, and protect the internal components from damage during transport and operator shifting at locations (arcade or street). In these functions, we might say, the cabinet as container takes on the dual function of shipping container and safe-deposit box.

The cabinet is also an interactive system, a material apparatus that affords the experience of play. Monitor orientation, side and top panels to reduce glare from overhead lights, sufficient width of a cabinet and nonobtrusive bezel to maximize visual access to the monitor, realistic mimetic controllers (e.g. steering wheels, gas and brake pedals on racing games like the 1976 *Night Driver*) to express the feel of a game, intuitive and responsive joysticks and buttons (typically with lighter spring controls) positioned sufficiently on a control panel to maximize comfort and accuracy,[35] and a cabinet size that supports user control while onlookers crowd around it are all attributes reminding us

Figure 2. Atari Industrial Designer Mike Querio's concept sketch for an unidentified coin-op game cabinet.

that users interact *with, through, and on the cabinet* to play its game.

The views of concept, container, and interactive system are conjoined with the cabinet as a product, one with the goal of turning a profit for the manufacturer as well as its operator. The game cabinet is marketed, branded, advertised, packaged with graphics, illustration, and type displayed on its exterior surfaces.[36] "We had to capture a person's attention in three seconds," Robert Flemate, former production art manager of Atari, told me when speaking of the task that a backlit attraction panel displaying his typeface performed in public spaces.[37] The package design of a cabinet promoted the machine to would-be players and operators alike (the graphically designed side panels are difficult to see when machines are lined-up along side one another but always visually prominent on a machine's sales sheet.)[38]

My aim with this cursory sketch is to suppress momentarily the view we find most common when considering a coin-op machine: its game, or *it* as a game. By using the word "views," I mean to indicate my continued interest in Don Ihde's concept of multistability as a helpful technique to show the different

variations of an artifact like the coin-op machine: what it really *is* remains uncertain, it can be regarded as many things at once, offering multiple variations.[39] An emphasis on multiple variations on the same artifact demonstrates that a single perspective of machine-*as*-game is privileged at the expense of alternative points of view that are coformative of the artifact under consideration. The value added to the historical study of games is that we set on hold the standard view of a coin-op machine defined by, or reduced to, its game program so that other relations can come into focus, other variations can be expanded.

These views express a shift in the historical *depth of field* to sharpen design processes and designed objects that have not manifested themselves within the history of games with the goal of treating them as actors coconstitutive of the coin-op machine. In photography, depth of field concerns the distance between the nearst and farthest objects in the camera's range of focus. Adjusting a camera's aperture and focal length allows one to *give priority* to specific details in a shot, deciding if an object in the foreground will be sharpened or blurred to highlight an object in the background. Depth of field *adjusts the terrain* to direct the eye to a desired focal point in the shot. It is a particularly rich metaphor to illustrate formative interrelations involved in designing a coin-op machine because nothing is being cropped from the big picture of Atari's coin-op division, only given different priority.

With this in mind, I present several leads to achieve a more holistic view—or at least one that can account for the many relations of dependency—of a coin-op machine compiled via a concentration on specific component parts resulting from various design practices. Atari itself is such a system, one we can use to help understand this assemblage. In 1974 the coin-op division consisted of the Model Shop, Industrial Design, Design Services, Electrical Engineering, and Cyan Engineering (responsible for game development)(see figure 3). Something we label the "coin-op game" emerges from the coordinated efforts of these various divisions. By the late 1970s when microchips replaced the transistor-to-transistor logic of a game circuit, we find even more divisions (complete with a graphics division that did not exist in the early 1970s) housed under Atari's Coin Operated Game Division: Electrical Engineering consisting of Special Projects Engineering (Electronic Design, Electronic Engineers, Technicians, Assemblers) and Components Engineering (Software Engineering, Programmers, Computer Systems); Pinball Design; Industrial Design (Concept Design, Product Design, Model Shop); Graphics Design (Production Art); Mechanical Engineering (Drafting and Mechanical Design); and Engineering Services
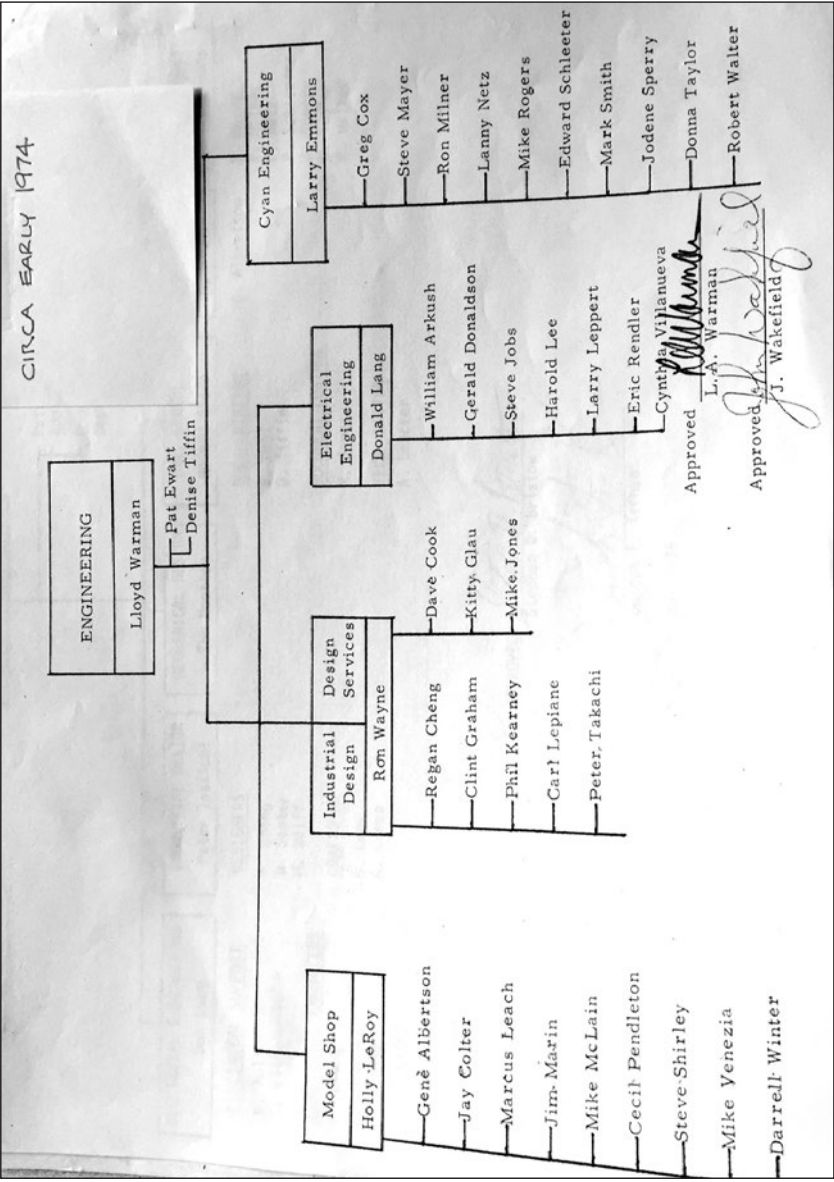
Figure 3. Atari organizational chart of Coin-op Engineering Division, circa 1974. Image courtesy of Peter Takaichi.

(Publications, Harness Design, P.C. Design, Documentation Control) (see figure 4). Working your eyes across Atari's visible organization of its coin-op engineering, it is apparent that our game histories have been silo-ed affairs, primarily rooted to a particular division within this interlocking structure: namely, "software engineering." Such a singular approach runs counter to how Atari actually coordinated its multi-divisional heterogeneous process for the production of its coin-op machines.

To materialize these processes into a history of design, I am, to borrow a slogan from actor-network theory, "following the actors," to assemble the various vantage points that will explode our single view of the coin-op cabinet. To "explode a view" is to adopt a conceptual framework wherein the various actors (designers, design practices, materials) constitutive of a complex artifact like a coin-op video game machine can be identified and detailed to gain a much more multidimensional view of the artifact. The game has been a privileged actor not, by any means, without due priority. However, when I pour over cabinet assembly drawings by Atari's industrial designers for *Video Pinball* (1978) that document every washer, wooden panel, monitor chassis, cleat, and even indicate exact locations of graphics, without mention of a game program, I find it impossible to ignore this year-long process of development—a fact that, given our sharpened view, is much needed to enrich, if not trouble, our current understanding of game design. Coin-op video game machines are three-dimensional objects, and our historical scholarship must also adopt multidimensional perspectives.

Cabinet Design is Design

"Because Pete and I were industrial design students at San Jose State, we had a lot of materials that we had to study. One of the big ones was *Abitare*. *Abitare*, the Italian style, just made it more contemporary for us at that time. We wanted that clean look: geometric shape with nice details. Modern. We never started out saying that that was going to be our 'look' or 'style,' it just happened because that's the way we designed. We'd look at some Italian design stuff. Maybe some furniture."[40] These words are from Regan Cheng who, along with Peter Takaichi, were young industrial designers hired by Atari in 1973 while still students at San Jose State University.[41] When I asked Cheng about his approach to designing cabinets for the new medium of video games he did not reference competing forms from the amusement industry like pinball or electro-mechanical machines. He spoke instead of the influence that the Italian design magazine *Abitare* had on his industrial design practice. How do you translate "that clean
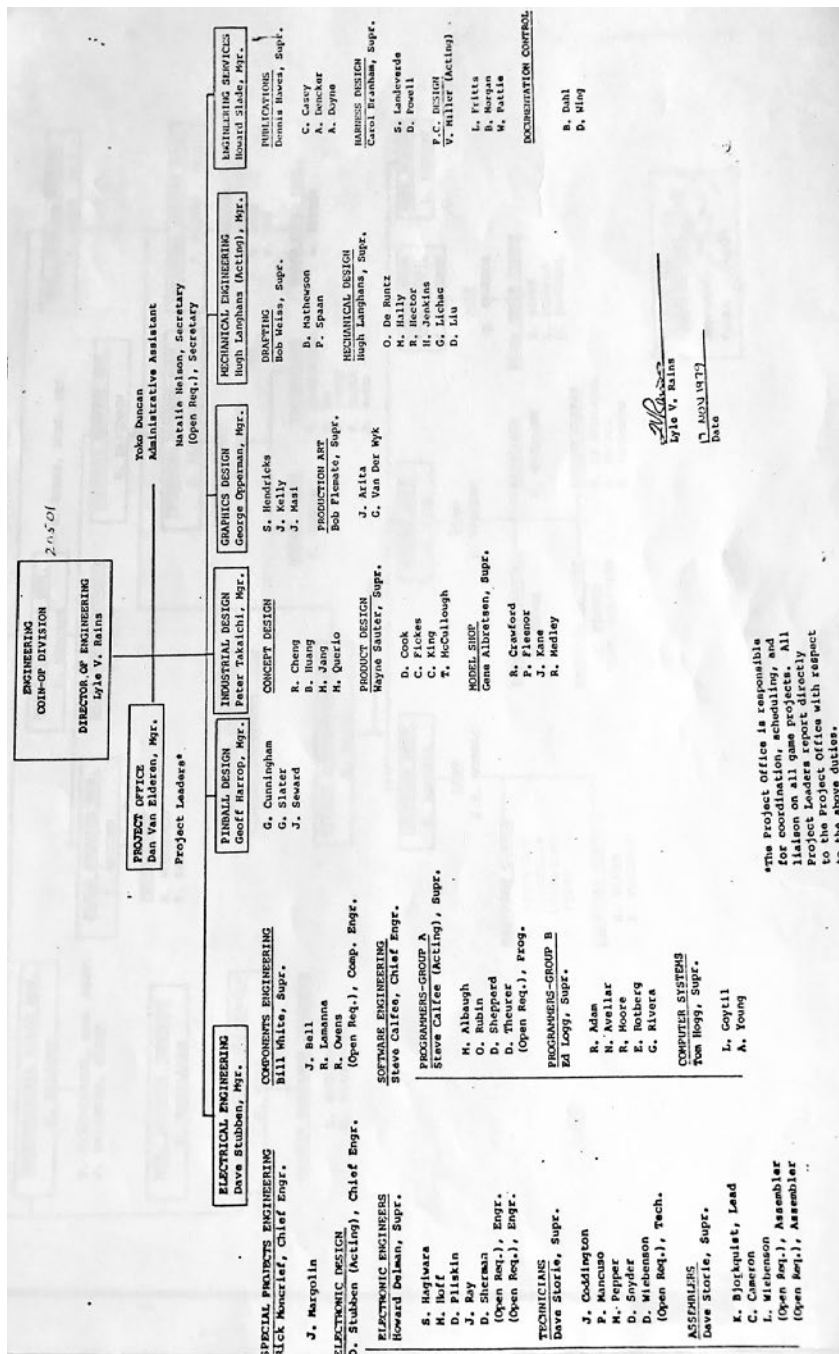
Figure 4. Atari organizational chart of Coin-op Engineering Division, May 1980. Image courtesy of Peter Takaichi.

Figure 5. The cabinet for Atari's *Gotcha* (1973) reflected the Italian design influence and contemporary look admired by designers Regan Cheng and Peter Takaichi. Photo courtesy of The Strong, Rochester, New York.

look" that Cheng and Takaichi studied while routinely flipping through the pages of *Abitare* and looking at late modern design for interiors, furniture, consumer goods, and architecture to coin-op cabinets?

In my interviews with both, they bemoaned sales and marketing's decision

to adopt veneer wood grain on a number of cabinets to make Atari's products look "sophisticated" in bars and cocktail lounges. Their design sensibility relished the use of rounded corners produced in vacuum-formed plastic—as witnessed on the front bezel for *Gotcha* (1973)(see figure 5). Cheng recalls his enthusiasm at the prospect of being able to design with vacuum-formed plastic: "What we were doing we thought of as art. We really had to fight for anything with a curve. We are big on ergonomics. For the overall design, we always tried to capture a feel. That was tough to do with a wood cut-out. We felt like we were kings designing whenever they'd say, 'Okay, you can include a piece of vacuum-formed plastic.' We'd all get really excited: Yes! We can have vacuum-formed plastic!"[42]

Takaichi shares Cheng's excitement when discussing the cabinet design for *Gotcha*, the first machine he worked on for his new employer.

> It's a very limiting medium to work with because everything, for the most part, is right-angles, rectangular shape. You can create a uniquely shaped side panel, but all of the cross panels are basically rectangular pieces of the wood. And to fill the gap in between you've got acrylic over the monitor. You've got metal for speaker grills or control panels. But the idea of being able to take the part of the cabinet that the player is interacting with: where his hands are, where the controls are, what he's looking at, what he's hearing . . . if you could put that into a piece of molded plastic mounted to a particle board cabinet, then the player sees the piece of molded plastic. And as a designer, that gives you a great deal of freedom. You can do so much more when you're able to form something, as opposed to having to cut something out of a sheet of flat material.[43]

Studying composite sketches by both Cheng and Takaichi at The Strong, I witnessed many concept designs that looked far removed from the more standard cabinet that would become familiar. As both informed me, expense and time of production often worked against such concepts. Their penchant for the modern, however, would take another form when molded forms proved too costly or ran contrary to sales and marketing. All white vinyl side panels outlined in black plastic T-molding provided that clean and minimal look they tried to achieve in their industrial design for Atari's coin-op products.

Nearly all Atari's up-right cabinets include white side panels.[44] The decision to use white on the exterior of a wooden cabinet may appear questionable at first, given the rough wear and tear machines experience at the hands of users and at locations where smoking and drinking were once common. "We used black T-Molding," Cheng remarked, "because we wanted the white side panels

as a background for the graphics. It looked nice. Really, clean."[45] Not only did the side panels achieve the desired clean look, but as Takaichi insists, "when you put colorful, well-done graphics on it, it popped."[46] These well-done graphics were the work of George Opperman who Atari commissioned to do graphic design for their coin-op cabinets beginning with his pronounced typography spelling *Gotcha*'s name vertically along the cabinet's polygonal side panels outlined in black T-molding.[47] Opperman quickly established the graphic design style of Atari's coin-ops along with the new company's promotional materials, like the sales sheets used to showcase its products to operators and at trade shows (e.g. Amusement and Music Operators Association, AMOA). Opperman joined Atari in 1976 to manage its Graphics Division. From 1973 until his untimely death in 1985, Opperman's graphic design and illustration helped stylishly define the company's products in a rich palette of brilliant colors and detailed line work, which conveyed the action players experienced when standing in between those white side panels to insert a coin.

A mountain of research presents itself here if those white side panels and accompanying silk-screen graphics are to provide anything meaningful to the history of games. From this view—intentionally suppressing the content of *Gotcha,* that is, the maze game the cabinet supports—I want to draw attention to other actors formative of the machine we call *Gotcha* by treating industrial and graphic design as content for game history. Current scholarship on game design would prove far too narrow because its treatment of *Gotcha* would concern itself only with its circuit. To generate space for other constitutive design practices, I also want to move well beyond trivia that tends to focus on *Gotcha*'s cabinet only to draw attention to its prototype controllers that were not released on the market. They were designed by Atari product designer George Faraco to resemble female breasts in the misguided attempt to attract female players. Neither Opperman's typography (the first instance of large-scale graphics applied to a coin-op video game) nor vacuum-formed plastic—designed to convey an ergonomic experience through modern style—are afforded sustained consideration for their active role in helping define the game, let alone for the histories of design they embody.

Repositioning the electronics responsible for the game—and coupling them with its "boob controls" as the only remarkable aspect of the cabinet into the background—provides a glimpse into the type of work a design history of coin-ops might offer. For instance, I do not wish to celebrate Opperman as an unsung, talented designer. To do so would maintain the "great men" narrative

that plagues the history of games, design, and technology. Instead, we require a reference system to obtain context within which to interpret the work: what was happening in graphic design during the 1970s, and how might we position Opperman's work as well as that produced by members of his department into this particular epoch of commercial/vernacular pop alongside such artists as Peter Max, John Alcorn, Pat Dypold, Milton Glaser, and others? Only within a comparative context between Atari's graphic design artifacts and graphic design history can we make any meaningful contribution to game history—and it is highly permissible that graphic design will be exposed to artifacts, designers, and practices not currently given attention within its canon.[48]

A last point here: the emphasis on modern design championed by Cheng and Takaichi was directed not at artifacts that would appear in the pages of *Abitare* or on pillars within galleries as icons of design. Coin-op machines may have offered the extraordinary in the form of interactive screen-based game play yet these products occupied, maybe even transformed, ordinary spaces like bars, pizza parlors, roller-skating rinks, game rooms, restaurants, and bus stations. Given their status as mass-produced consumer entertainment, it will be necessary as this research progresses to attend to the influential role location played in their design. Contexts of design and use cannot be easily separated. In quotidian spaces where users played a chase game like *Gotcha* by moving a square and plus sign around a maze with stick controllers, they would come to experience the interaction design played out on and through Atari's cabinets. The ubiquity of such interactive products, with their large-scale supergraphic-like images applied to their external surfaces, alerts us to social experiences with designed artifacts that, once public, cease to occupy such spaces within our present everyday life. Working through the design processes at Atari will serve to enrich game histories by offering invaluable insights to better understand user experience, interaction, and industrial and graphic design.

Platform Studies Does Not Scratch These Surfaces

Platform studies' emphasis on closely studying the relationships between computational architecture and software design for creative development is a much-welcomed focus that has influenced the history of games. And it will continue do so, especially because it provides a method of understanding the significance of technological constraints and support in software and hardware development. It offers a highly insightful means of producing game histories in which platforms are studied within the context of their historical develop-

ment and their technical specificities. Before Montfort and Bogost's *Racing the Beam: The Atari Video Computer System* (2009), these aspects had been largely overlooked by the field of game studies. Moreover, we can readily imagine how such investigations will radically open up game design so that design decisions and processes become better documented, interpreted, and explained for the benefit of historical study.

Elsewhere I have explored the relationship between platform studies and game history.[49] So here, I wish to only touch upon what I hope leads to a more expansive approach to artifacts in game history when platform studies and design history work together. Platform studies evokes metaphors of depth to help illustrate the aims of its method. They purport to "dig down to the code" or "to the metal" in their analyses.[50] This focus, I should point out, bypasses other design processes and histories that must be removed, literally and figuratively, so that the "metal" can be revealed. Of course, this is the intent of platform studies, but it also begs the question: what about those other intricate design assemblies housing, supporting the metal? Can they be cast aside so easily when they, too, demonstrate creative practices and the negotiation of physical and technical constraints? As Montfort and Bogost insist in their study of the VCS, "a platform must take a material form" and "other components … make up the hardware of a physical computer system."[51] Dual considerations of platform and cabinet would prove an excellent way to realize platform studies' goal to attend to "the connection between technical specifics and culture," with both being explored in the wider parameters that design history enables.[52] The specification of a platform certainly supports the exploded view that my research favors to adhere to the complexity of an artifact such as a coin-op video game machine. Still I worry that, as platform studies increasingly gains traction in historical research about games, its approach to arcade platforms may reduce the coin-op video game machine to its printed-circuit boards and monitor.[53] The point of an exploded view is to show relationships between individual components, to disassemble to reassemble. Ideally, scholars interested in arcade platforms could team with design history scholars to consider the unexplored relationships between a coin-op's operational system, packaging, and industrial and interaction design. An analogy may be helpful to grasp why a broader approach to design in the history of games is necessary: would you accept histories of car design if all you ever read about was the internal combustion engine? Why accept software and hardware design as the only design of significance in the history of games?

Game History Can Learn from Design History

Intriguing parallels exist between the move toward critical historical studies of games and disciplinary debates that have shaped the field of design history.[54] For instance, when Kjetil Fallan speaks of the importance of designers to design history, he writes, "Design historians should not, cannot, and will never ignore designers and practices."[55] In the very next sentence, he proceeds to caution design historians not to become "merely the faithful, genuflecting chroniclers of designers and their achievements."[56] We do not need to make a great leap to observe a similar concern voiced by Huhtamo about game historians whose work serves only to note individual achievement and establish game origins. Celebrating "good" design and "great" designers resembles too closely game history's penchant for tributary scholarship devoted to individual game designers that always acclaims their achievements as landmarks.

In seeking such parallels in my reading, I simply substitute the word "game" for "design" where it appears in a number of polemical debates about the practice of design history. Thus, the opening lines of Fran Hannah and Tim Putnam's "Taking Stock in Design History" in the British journal *Block* (1980) would read: "What are *games*? How and for whom have they existed? What is a history of *games* a history of? What are its distinctive problems and methods?"[57] Such questions are vital for interrogating the practice of game history as I have already demonstrated. The question is about possibility. We must now ask what is a history of games a history of because new models and methods will make existing histories increasingly untenable.

Hannah and Putnam also insist on the need to "open up the way to think historically about design as a complex social relation interconnected with other relations."[58] Here is where things get murky in current game history. The reigning histories of games, with their game-centric view, do not offer the complex social relations advocated for by Hannah and Putnam nearly forty years ago for the history of design, though we ought to remain hopeful given the signs of a different kind of game history already developing. Complex social relations can team with Hunt's aforementioned emphasis on cohesion or interaction between topics for her field of cultural history so that the production of historical studies of games are informed by and work through diverse forms of historical scholarship and subjects. My research for *Atari Modern* already teaches me, as Barry Katz also observes in his history of Silicon Valley design, that "the foundations of the new discipline of interaction design" can be located in the industrial design and engineering work found at Atari in the early 1970s.[59] The study of game

history can be deepened—or, better yet, spread to different surfaces—through its friendship with design history.

I offer a final passage (there are many to choose) modified, as I suggest, by replacing the word design with the word game. This one comes from John A. Walker's *Design History and the History of Design*: "Although the phrase 'the history of *games*' implies that there is a single, homogeneous object of study, in practice *game* history never supplies us with a single, complete, homogeneous account upon which we can all agree. There are always multiple histories, various histories of *games*. These histories are the output, the product of the discipline *game* history."[60] No discipline of game history exists. It will most likely be treated as a specific focus in game studies or come to be regarded as an area of specialization within general historical studies, drawing from multiple disciplines. In the future, once we have swallowed the mouthful of New Video Game History, we will realize that we must make history plural to account for all of the diverse histories constituting the subject.

These passages I have modified demonstrate that our thinking about the current state of game history can learn a great deal from design history's own intellectual trajectory. Not only can scholars of game history open up the way to thinking historically about games by broadening, for instance, how we account for design within the context of game design but also by taking onboard insights and perspectives from a field that has shaken itself free of the similarly restrictive approaches that once demarcated the objects of its history and the aims of its historiography.

Notes

1. Lisa Gitelman and Geoffrey B. Pingree, eds., *New Media, 1740–1915* (2003), xi.

2. W. Terrence Gordon, *McLuhan: A Guide for the Perplexed* (2010), 127.

3. In seeking such possibilities, it pays to remain mindful that "new" does transform its fellow words. Any repositioning or reorientation (or unthinking) gained from this exploration turns back upon the words "Video Game History" so that "new" may achieve some significance (even minor) to justify its inclusion (otherwise it is nothing more than a new cover for an old book, a revised edition whose author could not be bothered to actually write an updated introduction).

4. See Erkki Huhtamo, "Slots of Fun, Slots of Trouble: An Archaeology of Arcade Gaming," in *Handbook of Computer Games Studies*, eds. Joost Raessens and Jeffrey Goldstein (2005), 3–21; and Raiford Guins, *Game After: A Cultural Study of Video Game Afterlife* (2014), 18–26.

5. A tidy appraisal of existent historical studies of video games resides in the first

few paragraphs of Laine Nooney's "A Pedestal, A Table, A Love Letter: Archaeologies of Gender in Videogame History," *Game Studies* 13 (2013), http://gamestudies.org/1302/articles/nooney.

6. Examples of challenges facing the documentation of game history can be examined in the two white paper reports produced by the Preserving Virtual Worlds Project and in John Andersen's "Selecting Save on the Games We Make" (2012) hosted at gamasutra.com.

7. David Edgerton's support for the contributions made by nonprofessional historians to the history of technology can also be applied to the history of games. He writes, "We should take nonprofessional historical ideas seriously not merely as objects of study, but also as contributions to our shared understanding of technology in history." See David Edgerton, "Innovation, Technology, or History: What is the Historiography of Technology About?" *Technology and Culture* 51(2010): 692.

8. I have grafted this point onto archival materials from one that Hayden White observes of F. R. Ankersmit's treatment of the "great classics of historiography." "None of them," White applauds, "has ever wrapped up a historical problem definitively; rather, they have always opened up a prospect on the past that inspires more study." And in the citation from Ankersmit that White comments on, the former offers the fitting line: "These books have proved to be the most powerful stimulators of the production of *more* writing—their effect is this to estrange us from the past, instead of placing it upon a kind of pedestal in a historiographical museum so that we can inspect it from all possible perspectives." Hayden White, *Figural Realism: Studies in the Mimesis Effects* (1999), 7. See also F. R. Ankersmit, "The Dilemma of Contemporary Anglo-Saxon Philosophy of History," *History and Theory* 25 (1986).

9. The locations of the material collected at Steve Bristow's home was conveyed to me by Stanford University Libraries Curator Henry Lowood, who acquired the items directly from Bristow's residence.

10. Carolyn Steedman, *Dust: The Archive and Cultural History* (2002), 68.

11. See Walter Benjamin, "Unpacking My Library: A Talk About Book Collecting," in *Illuminations*, ed. Hannah Arendt, trans. Harry Zohn (1992), 61–69. In instances where vital research materials reside in the hands of collectors unwilling to share, it is hard to agree with Walter Benjamin's view on the "real collector" whose "ownership is the most intimate relationship that one can have to objects," Ibid., 69. Must we wait until a collector dies before we too can experience such a relationship by introducing this stuff into the "tactical sphere" of the cultural institution? Would collectors be willing to try an "open marriage" to benefit researchers? Furthermore, ought one's personal intimacy supplant the thirst of public knowledge?

12. Arlette Farge, *The Allure of the Archives* (2013), 12.

13. I have employed the word "continuous" not to give the impression that such materials are held as inestimable truths or discoveries. This inclusion also serves as a nod to Foucault's essay, "Nietzsche, Freud, Marx," where he writes: "If interpretation is a never-ending task, it is simply because there is nothing to interpret. There is nothing absolutely primary to interpret because, when all is said and done, underneath it all everything is already interpretation." Michel Foucault, "Nietzsche, Freud, Marx," in

Aesthetics, Method, and Epistemology: Essential Writings of Foucault, 1954–1984, ed. James D. Faubion (1998), 275.

14. "Critical" is an overused word. The goal is that it will no longer even be necessary once game history raising its scholarly game.

15. W. Terrence Gordon references this particular phrase in his archival research on McLuhan's lexicon for the study of media. The specific phrase is found in a personal letter addressed to Bonnie Brennan held at the National Archives of Canada and dated 28 October 1966. See Gordon, *McLuhan*, 136. The phrase reflects the influence that I. A. Richard's *Practical Criticism: A Study of Literary Judgment* (orig. 1929) has had on McLuhan's thought.

16. Marshall McLuhan, "Notes on the Media as Art Forms," in *Explorations* 2 (1954): 6–13; reprinted in Marshall McLuhan, *Marshall McLuhan Unbound*, Vol. 15, ed. Eric McLuhan (2005).

17. Marshall McLuhan, *Understanding Media: The Extensions of Man* (1964; repr., 1994), 44.

18. Hayden White, "An Old Question Raised Again: Is Historiography Art or Science? (Response to Iggers)," *Rethinking History* 4 (2000): 392.

19. Hayden White, *Figural Realism: Studies in the Mimesis Effect* (1999), 2.

20. Aside from this themed issue of the *American Journal of Play,* I would also point to the landmark "The History of Computing," themed issue of *IEEE Annals of the History of Computing*, Vol. 31, No. 3 (July-September 2009), *Game Studies'* "Game History: A Special Issue," Vol. 13, No. 2 (December 2013), and *Reconstruction: Studies in Contemporary Culture*'s themed issue on the "Undead Arcade" coedited by Carly A. Kocurek and Samuel Tobin, Vol. 14, No. 1 (2014). I would also add the special issue of *Kinephanos* entitled "Cultural History of Video Games" (June 2015). More recently we could include the 2016 special section of *Rethinking History* (Vol. 21, No. 3) devoted to historical game studies edited by Adam Chapman, Anna Foka, and Jonathan Westin.

21. MIT Press's willingness to support a Game Histories book series alongside its highly influential Platform Studies and Playful Thinking book series is a major investment in the subject.

22. I will limit myself to listing one conference that I found incredibly diverse in subjects and historical methods: "Challenge the Past/Diversify the Future: A Critical Approach to Visual and Multi-Sensory Representations for History and Culture" University of Gothenburg, Sweden, March 19–21, 2015.

23. See Facebook's Media Archaeology and Historical Game Studies Network groups.

24. I am honored to have had my research on game history accepted at the Society for the History of Technology (SHOT) annual conference in 2012 (Copenhagen, Denmark) and 2013 (Portland, ME). The 2015 SHOT conference considered history of video games within the history of technology in the form of a roundtable consisting of myself, Lori Emerson, Finn Arne Jørgensen, Elizabeth Losh, Henry Lowood, and Melanie Swalwell. In addition to this inroad into a major historical society, Lowood, myself, and Carly Kocurek and Jennifer de Winter organized a panel called "Video Games as Design History" at the 2015 Design History Society Annual Conference (San Francisco, CA). I

look forward to the day when the American Historical Association annual conference hosts a game history panel.

25. It is so refreshing to see lines like those written by Thomas H. Rousse in his article devoted to a historical analysis of Vectorbeam's *Warrior* (1979): "Using archival resources, personal correspondence, first-hand gameplay experience with a working instance of the arcade cabinet and previously published interviews and listserv discussions with creators of the game, this article attempts to account for *Warrior*'s genesis and lifespan. In so doing, it does not strive to be a definitive text of only undisputed facts. Instead, it seeks to bring competing and contradictory accounts into conversation, declining the veneer of unitary authority in favor of capturing and appreciating the value of the ambiguity that exists at the time of writing." Thomas H. Rousse, "Reconstructing *Warrior*: Vectorbeams, Natural Magick, & Business Intrigue," *Kinephanos* (2015): 152.

26. One important exception is a keynote address by Melanie Swalwell given at the 2013 History of Games International Conference in Montreal, June 21–23. Swalwell's address took the writing of game history as its subject to examine the forms of historiography structuring how we know the history of games. Although not published, her talk has been expanded and is available at academia.edu: https://www.academia.edu/4803227/Turning_Historical_Fragments_into_a_unique_expe rience_with_the_past_Reflections_on_conducting_writing_and_experiencing_games_his tory.

27. Jaako Suominen identities the following genres as most active in the writing of game history: enthusiasts, emancipations, genealogies, deep excavations, and pathologies. See Jaako Suominen, "How to Present the History of Digital Games: Enthusiast, Emancipatory, Genealogical, and Pathological Approaches," *Games and Culture* (2016).

28. I would also point to historical scholarship such as: Laine Nooney's meticulous research on Sierra-Online, Carly A. Kocurek's *Coin-Operated Americans: Rebooting Boyhood at the Video Game Arcade* (2015); Chaim Gingold's history of *SimCity*; Carlin Wing's dissertation that explores the history of "true bounce" in modern sport and computer simulation, and Henry Lowood's long-term study on the history of the game engine.

29. Lynn Hunt, *The New Cultural History: Essays* (1989), 9.

30. Nooney, "A Pedestal, A Table, A Love Letter."

31. Hunt, *New Cultural History*, 9.

32. It is my intention that the word "critical" has a short shelf life in this phrase. Ideally it will be absorbed within historical studies of games being produced. I should say that such a phrase is not the only one in current circulation attempting to specify the study of game history. "Historical game studies" is offered as "the study of those games that in some way represent the past or relate to discourses about it." See Adam Chapman, *Digital Games as History: How Videogames Represent the Past and Offer Access to Historical Practice* (2016), 16. Such an approach appears mainly occupied with historical simulation, and there does not seem to be much overlap between the two camps. At the risk of being reductive, what I point to as "critical historical studies of games" looks to Huhtamo's "Slots of Fun" piece as foundational historiography on games while historical game studies adopts William Uricchio's "Simulation, History and Computer Games" as

its foundational text. Both pieces, of course, appeared in the same collection, *Handbook of Computer Games Studies* (2005).

33. Benjamin, "Unpacking My Library," 61.

34. The durable plastic shelving is sold as panels each measuring H 18.25" W 18.25" D 10" for personal assembly.

35. The unique "nudge" control assembly on Atari's *Video Pinball* (1978) to simulate the play and feel of pinball caused confusion among participants taking part in Player Survey during September 15–16, 1978, at a Time Out arcade, San Jose, CA. The report found that the new nudge feature was used by the test group however "observations indicated many players thought that they were nudging the game, but were actually shaking or pushing it like a regular pinball game" (4). The owner of Time Out expressed his concern of the durability of the nudge controller. "Strong use of the nudge feature," the report notes of the concern, "may cause the panel to break" (6). Marketing Services, "Player Survey Summary Report" (unpublished report, September 25, 1978), 1–10, Box 5, Folder 25, Atari Coin-Op Division corporate records, Brian Sutton-Smith Library and Archives of Play at The Strong.

36. I am not suggesting that graphic design occurs after a cabinet design has been approved. Based on the industrial design documents held at The Strong, a machine's graphics are included in design assembly drawings, and mention of artwork concepts in project notes is present at early stages of development.

37. Robert Flemate, interview with author, September 9, 2015.

38. Referring to the packaging of a machine, Flemate even states: "The side-panels were done for the sales-sheets, for the operators who would buy the machines. The player can't even see the sides unless the machine is displayed prominently." Flemante, interview, September 9, 2015.

39. See in particular Don Ihde books: *Technology and The Lifeworld: From Garden to Earth* (1990); *Postphenomenology and Technoscience: The Peking University Lectures* (2009); *Heidegger's Technologies: Postphenomenological Perspectives* (2010); and *Experimental Phenomenology: Multistabilities*, 2nd ed. (2012).

40. Regan Cheng, interview with author, May 28, 2015.

41. San Jose State University's Industrial Design program will occupy a significant place within my project due to many of its students moving directly to Atari upon graduation. On the heels of Takaichi and Cheng, SJSU alumni Carl Leplane, Barney Huang, Mike Jang, and Mike Querio joined the Industrial Design division at Atari in the mid-to-late 1970s.

42. Cheng, interview, May 28, 2015.

43. Peter Takaichi, interview with author, September 11, 2015.

44. Notable exceptions are the use of black vinyl sides to have the cabinet's form support the content of its game as in the case of the upright model for *Night Driver* (1976) as well as to provide an outer-space setting for cabinets displaying illustrations of spaceships like *Lunar Lander* (1979), *Asteroids* (1979), and *Star Wars* (1983).

45. Cheng, interview, May 28, 2015.

46. Takaichi, interview, September 11, 2015.

47. George Opperman was originally with the industrial design firm and advertising agency, GVO, which stood for the partnership of Dale G̲ruyé, Noland V̲ogt, and O̲pperman. According to Barry Katz, Opperman left GVO in 1971. Barry Katz, *Make It New: The History of Silicon Valley Design* (2015), 28. Opperman formed his next design firm with Ursula Harrington as Opperman-Harrington. It is at this firm that he added Atari to his client roster.

48. Louise Sandhaus's *Earthquakes, Mudslides, Fires & Riots: California & Graphic Design, 1936–1986* (2014) is the only book devoted to graphic design history that includes coin-op video games. Unfortunately, she places them within her historical survey of California graphic design as exemplars of motion graphics rather than attend to the graphic design engulfing the monitor at which she focuses her attention.

49. See my "Platform Studies as Method for the Critical Historical Study of Electronic Games?" *Digital Culture & Education* 8 (2016), http://www.digitalcultureandeducation.com/volume-8/platform-studies-as-method-for-the-critical-historical-study-of-electronic-games.

50. See "Home"@platformstudies.com

51. Nick Montfort and Ian Bogost, *Racing The Beam: The Atari Video Computer System*, (2009), 2.

52. See Ian Bogost and Nick Montfort, "Platform Studies: Frequently Questioned Answers." *Proceedings of the Digital Arts and Culture Conference* (2009), https://escholarship.org/uc/item/01r0k9br.

53. This is exactly what we witness when Brett Camper stipulates that he "aims to bring Montfort and Bogost's concept of *platform studies* to the realm of the early arcade" (italics original), via his discussion of Williams Electronics hardware for the company's *Defender*, hardly an "early arcade" title if we consider its nineteenth-century origins. See Brett Camper, "Color-Cycled Space Fumes in the Pixel Particle Shockwave: The Technical Aesthetics of *Defender* and the Williams Arcade Platform, 1980–82", in *Before the Crash: Early Video Game History*, ed. Mark J. P. Wolf (2012), 169.

54. I began to identify parallels between the intellectual histories of design history and game history in a recent article published on coin-op cabinet design and will include a section in *Atari Modern* to share my full observations. See Raiford Guins, "Beyond the Bezel: Coin-Op Arcade Video Game Cabinets as Design History," *Journal of Design History* 28 (2015): 405–426. An overview of the debates informing design history can be found in Grace Lees-Maffei and Rebecca Houze, eds., *The Design History Reader* (2010). The section, 'Foundations, Debates, Historiography, 1980-95', is particularly helpful.

55. Kjetil Fallan, "De-tooling Design History: To What Purpose and for Whom Do We Write?" *Design and Culture* 5 (2013): 16.

56. Ibid.

57. Fran Hannah and Tim Putnam, "Taking Stock in Design History," *Block* 3 (1980): 25.

58. Ibid., 26.

59. Katz, *Make It New*, 94.

60. John A. Walker, *Design History and the History of Design* excerpted in *The Design History Reader*, eds. Lees-Maffei and Houze, 279.