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# The Pleasures of Computer Gaming

*Essays on Cultural History,  
Theory and Aesthetics*

Edited by  
MELANIE SWALWELL  
and JASON WILSON



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## "Participation TV": Videogame Archaeology and New Media Art

Jason Wilson

*One of the foremost tasks of art has always been the creation of a demand which could be fully satisfied only later. The history of every art form shows critical epochs in which a certain art form aspires to effects which could be fully obtained only with a changed technical standard, that is to say, in a new art form.*

—Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," 1936.

*Although the art of the future could take any one of a number of directions, it seems to me that, with the steady evolution of information processing techniques in our society, an increasing amount of thought will be given to the aesthetic relationship between ourselves and our computer environments — whether or not this relationship falls into the scope of the fine arts.... As our involvement with electronic technology increases ... the art experience may undergo a process of internalization where the constant two-way exchange of information becomes a normative goal. We should rightfully consider such a communication shift as an evolutionary step in aesthetic response.*

—Jack Burnham, *The Aesthetics of Intelligent Systems*, 1970.

The "archaeology" of videogame play and culture is emerging as a productive focus for scholarship. As videogame history moves beyond what Huhtamo calls its "chronicle era," more researchers are trying to "broaden the historical perspectives of digital games from the internal history of computing to the general cultural history of modernity and modern media technologies," to understand the "rules, practices, conditions and functions governing the actual instances of cultural events" (Suominen and Parikka). Huhtamo defines the project of videogame archaeology as "the cultural and historical mapping of electronic gaming. Its basic premise is at least seemingly simple: electronic games did not appear out of nowhere; they have a cultural background that needs to be excavated."

Rather than seeing video games as a self-contained cultural field with only an internal, technological history, videogame archaeology instead connects games with broader contexts and longer histories. Rather than offering linear accounts of the medium's development within the discourse of "upgrade culture" (Dovey and Kennedy), videogame archaeology tries to understand video games as enmeshed in wider cultural, economic, and technological changes.

There has already been significant and valuable work in this area, which has two main thrusts. On the one hand, there is research that places video games within the history of popular culture and popular amusements. Early on in the history of game studies, Fuller and Jenkins connect the "spatial stories" of platform games with popular travel writing. Darley ties video games and other "new media genres" with the history of fairground amusements and attractions. Huhtamo traces the connections between videogame play and the entire modern history of slot-machine amusements, showing that video games emerged into a preexisting matrix of venues, audience behaviors, and even censorious official discourses. And a range of authors — including Juul (2001, 2003) and Frasca — insist on the continuities between **video games and pre-digital games**. All of these archaeologies connecting games to other forms of popular culture allow comparative studies of video games by drawing out analogies between them and earlier or parallel forms of popular culture.

There is a second broad emphasis on the connections between videogame technologies and the **"military-entertainment complex"** or the history of human-computer interaction. Lowood and Lenoir show parallels between the emergence of the video games and military simulation industries, and they show too that personnel cross between video games and simulation industries. Crogan reflects on the epistemology and phenomenology of real-time strategy games, and he compares them with the board-based wargames that they superseded. Lowood focuses on connections between *Pong* and the history of computing. This tradition in videogame archaeology reminds its readers of the close links between video games and the technological changes that underwrite both the information economy and new forms of conflict.

This chapter aims to extend the range of videogame archaeology by considering the relationship between the earliest video games and an artistic and creative milieu that pertained throughout the West and beyond in the 1960s and 1970s. The direct comparisons that are made between video games and new media art may run counter to the sense, which can be detected in the work of many artists and theorists, that video games are a problematic, reactionary counterpoint to the critical work of new media artists. **Charlotte Davies**, designer of important works of virtual art such as *Osmose*, is representative of a tendency to rhetorically position games in opposition to new media art when she writes:

Commercial computer games approach interactivity as a means of empowering the human subject through violence and aggression. These conventional approaches to digital media reflect our culture's Cartesian world-view, with its tendency to reduce the world and its myriad of inhabitants to a "standing-reserve" for human consumption [quoted in Shinkle].

In writing this chapter, I hope to show that because of their deep, mutual involvement at their origins, there is no easy way to separate video games and new media art, and that drawing sharp binary distinctions between early games and new media art is less productive than seeing differences alongside important resemblances. Early games and new media art embody a series of shifting relationships with the technology and institutions of television, which in the 1960s and early 1970s — the focal period of this analysis — were bound in the model of mass broadcasting. This moves beyond Wolf's noting of the countercultural engagement of many early game designers in relation to the abstract visuality of early video games. Apart from the happenstance of "hippie programmers," I hope to show that the earliest examples of new media art and videogame design were produced from similar impulses, which drew on a series of related discourses in 1960s culture.

This chapter first discusses the early 1960s "TV works" of Nam June Paik. It shows how the works were simultaneously a critique of the nexus of television technology and the apparatus of broadcasting and an effort to create "real-time" works that were open to viewer participation. Second, there is a discussion of the context that informed Paik's interventions. Both the artist and these works lie at the crossroads of the Fluxus movement, early new media art, conceptual art, and what Burnham (1978), and later Drucker, calls "post-objective" art. Third, there is a tracing of the evolution of video games as a viable commercial medium over the course of the 1960s and early 1970s, which looks at Ralph Baer's efforts toward the Magnavox Odyssey, and Nolan Bushnell's attempts to market first *Computer Space* and then (successfully) *Pong* as coin-operated (coin-op) arcade technologies. Throughout the account of Baer and Bushnell's work, there are asides that compare it with Paik's and relate it to the context of "postobjective" practice. A concluding section makes the differences and important similarities between all these efforts to make "Participation TV" explicit. While this chapter at no stage suggests any explicit mutual influences, it shows that both early new media artists and early game designers articulated a desire to change broadcast television, created manipulable television images, and incorporated "playfulness" in their contributions in these areas.

## Nam June Paik and Participation TV

Beginning with his first television exhibition at Rolf Jahrling's Galerie Parnass in Wuppertal-Elberfeld, Germany, in March 1963, Nam June Paik, who had been and was to be so involved in the reconfiguration of institutional art, made his attempt to change the relationship between television technology, images, and the viewer.

In *Zen for TV*, Paik redefined television as a technology of rapt attention, rather than a technology of distraction as it had hitherto, and has even hence, been seen.<sup>1</sup> The work consists of a single, vertical white strip on the blank, dark background of a television monitor, produced by distorting the television's monitor image with a magnet. It is a highly abstract, static image set within the television set, a technology that is here reconceived as the basis for a new kind of sculptural work, or as a new kind of frame for abstract pictorial works. Its visual simplicity is the way the work reveals its own importance, though. It announces that from this moment, as Cynthia Goodman puts it, "For Nam June Paik, television was not simply an iconic presence, but a malleable medium." *Zen for TV* reimagines television as an object for meditation, whose visual output was in this case given transcendent, religious connotations.

The means by which Paik produced *Zen for TV*'s image — a magnet on top of the set — revealed the televisual image as amenable to direct, local action, and defined the screen as a pictorial surface for the artist. In an allusion to the vertical "zips" which appeared in the work of mid-century abstract artist Barnett Newman, from *Onement I* forward, Paik not only playfully mocks the high seriousness of high Modernism, but also takes over some of Newman's purpose — the reorientation of the artwork toward the establishment of a closer relationship with the observer's body, and the relocation of the sublime in the products of human industry.<sup>2</sup>

From the same exhibition is a work that further sculpts the image produced by direct manipulation of the electronic image, *Magnet TV*. Like *Zen for TV*, *Magnet TV* was produced by means of magnetic interference with a television monitor image, however, this time the image produced was a more complex and aestheticized abstraction: a spiraling, greenish nest of vector lines. Though it is only accompanied by ambient sound, Tancin argues that with this work, Paik

draws our attention to what had become a commonplace object by 1965: the television. By displacing the television set from the living room to the art gallery, Paik forces the public to separate the physical properties of the television from its content and to evaluate the object for what it is: image and sound.

*Magnet TV* removes television from its customary venue of reception (the home) and estranges it from its usual purpose (the reception of broadcasting).

As well as revealing television's bare audiovisual properties, *Magnet TV* underlines and extends *Zen for TV's* discovery of television as a surface immanent to the artist's localized practice — and it shows that there are even greater possibilities for manipulating the television image. By contrast with *Zen for TV's* depthless flat line, *Magnet TV* is far more complex and sculptural.

Perhaps the most striking of Paik's television works from this exhibition in 1963, particularly considered in relation to video games, is *Participation TV*. In this piece, a TV set's visual output is not fixed; by speaking, yelling, or singing into an attached microphone, the viewer is able to produce a variety of abstract shapes on the screen. The technical means for this new mode of image-making are a microphone and a sound frequency amplifier that transforms and feeds the signals directly to the television's cathode ray tube and its steering coils to produce scattergun kinetic images. Its importance lies not so much in these images themselves, however striking, but in the way Paik incorporates them in a playful, participatory "real-time" work. Television had long offered real-time or "live" images, and indeed most early television broadcasting was transmitted live rather than recorded (Barnouw, Jacobs).<sup>3</sup> Few if any visitors to Jahrling's gallery in 1963 would ever have been able to directly manipulate electronic televisual images. For all its innovations, *Participation TV* is a charmingly jury-rigged technology. It answers nicely to the description Lowood would later give to *Pong*: it represents "a modest investment in electronic components, a modified television set, and some ad hoc wiring and parts" (2). But the results are astounding.

*Participation TV* is permanently unfinished, and rather than a realized pictorial work, it is a playful structure that invites the viewer into certain kinds of physical intimacy with itself, into performing and laboring within it. It divides the gallery audience: there are still spectators separated from the work as subjects from an object, but one by one the visitors who step up to the microphone inhabit a new kind of productive spectatorship. This is a contrast with the various kinds of separation between spectator and object that had pertained in the experience of visual art, but resembles the bifurcated model of videogames spectatorship offered by Newman, in which "the pleasures of videogames are frequently enjoyed by those that commonsense might encourage us to consider as non-players — "onlookers" that exert no direct control via the game controls." Here, the technology of TV is not only defined as something open to local pictorial activity, but also as a space for the cooperative activity of audience and artist, the latter responsible for designing structures of playful interaction. Even though the images produced by Paik's work are of interest, the questions we ask ourselves about them have less to do with the use of color, line, and composition within the space of the frame,

less the kinds of questions we ask of a work that is separated from us as object from subject, and more to do with the elegance of the relationship the artist proposes between our bodies and pictorial space, the kinds of actions we can take within this structure, and the quality of our pleasures of co-creation.

Paik put his innovations, and the immersion in the techniques of electrical engineering that led to them, down to his discovery that television "was made of electrons and protons. It made sense to me that I might as well use protons and electrons directly." He looked forward to "the day when the collaboration of the artist and engineer will progress into the unification of the artist and engineer into one person," since the artist's getting things made to order missed the possibility for "precious errors," and "I have found that the by-product is often more valuable than the envisioned aim" (Kearns). This idea of the union of artist and engineer foreshadows Grau's conception of the "media artist" who represents "a new kind of artist, who not only sounds out the aesthetic potential of advanced methods of creating images ... but also specifically researches innovative forms of interaction and interface design" (3), and Popper's "virtual artist" who differs from traditional artists in pursuing "techno-aesthetic creative commitments" (1).

In 1965, talking about the tendencies in his work of the early 1960s, and looking forward to projects like *Video Synthesizer*, Paik said he wanted his own interventions leading to something

which anyone could use in his own home, using his increased leisure to transform his TV set from a passive pastime to active creation.... Communication means the two-way communications. One-way communication is simply a notification ... like a draft call. TV has been a typical case of this non-communication and [the] mass audience had only one freedom, that is to turn on or off the TV.... My obsession with TV for the past 10 years has been, if I look back and think clearly, a steady progression towards more differentiated participation by viewers [Kearns].

Paik is critical here of the way television experiences had been framed and organized to this point, and in particular the domestic consumption of broadcast television, which was in the early 1960s the hegemonic use of that technology (Spigel 1992). By using television technology for a new purpose, Paik is trying explicitly to critique the nexus between television as a technology and the apparatus and institutions of broadcasting, which assumed and gathered a mass audience, and which, as Spigel's work shows, was so involved with the "suburbanization" of life in America and the capitalist West after the Second World War. Television has been seen as crucial to the "mobile privatization," which allowed the great transformation that was suburbanization (Williams, Spigel 1992, 2001). It resolved the contradiction between the isolating privacy of suburban life and the continuing dependence of suburban households on the cities they had evacuated. By providing a "window on the

world" (Spigel 1992) and a small range of simultaneous broadcast experiences for a dispersed population, television helped constitute the "imagined community" that sustained social cohesion in the face of geographical fragmentation. Paik's identification of mass broadcasting with a Vietnam-era "draft call" shows that his desire to vary the uses of television is bound up with a challenge to consensus, authority, and suburban conformism that, he believed, were involved in broadcasting.

Whatever we might think of Paik's position in the light of long-held notions of TV's active audience (starting, perhaps with Fiske and Hartley), or of warnings such as William Boddy's about the tendency to feminize and passivize the television audience in the promotion of new media, his clear intention is to change and vary the uses of television by *fragmenting* the publicity of broadcasting, and to construct systems of interaction within which the audience could take their place as co-creators.

Paik's work in and of itself did not translate into a wholesale transformation of the uses of television, and they never fed directly into any mass-market domestic media technology. Indeed, beyond a few avant-garde television broadcasts, Paik's work, including his television work, was notably confined to the *public* spaces of galleries and theaters. As McCarthy notes, television has always been in part a public medium, and, indeed, continues to function in regulating public space. Nevertheless, it is striking that Paik's ambition to turn television to new uses — even though he envisions his work as an effort to change a domestic medium — requires him to bring television's new possibilities into public view. What Popper calls the "antitelevision stance" (22) of Paik and other video artists had less of a direct effect on mass media consumption patterns than it did on the emergence of new kinds of artistic practices in public galleries and, later, the Internet. But the technological developments, redefinitions of the idea of the artwork, and broader underlying structural changes that informed Paik's work and its production of new possibilities for television, outlined below, resonated beyond the gallery.

### *Paik's Context: "Post-objective" Art, Fluxus, Art and Technology and "System Aesthetics"*

Paik's work with *Participation TV* was elegant and original, but it arose at a specific juncture in the history of twentieth-century visual culture in which a broad range of engineers, artists, and a number of people who combined the interests and skills of both were enthusiastically engaging in areas of interactivity, mass culture, and then-emerging digital and electronic technologies. This juncture was part of deeper changes, including a broader

desire to turn television to new uses, and to make interactive, real-time works. It overlapped with the emergence of the earliest video games.

In particular, Paik's work can be set alongside what Johanna Drucker calls "postformalist" or "antiformalist" tendencies in art from the 1960s and 1970s, particularly the work of his colleagues in the Fluxus movement and theorists of these movements, such as Jack Burnham. Understanding this context for Paik's TV works can help us further our understanding of its relationship with early video games, as well as opening the intriguing possibility that where such movements in avant-garde practice gave way to the hegemony of conceptual art in the galleries (Gere), some of their objectives, enthusiasms, and tendencies persisted in early videogame design.

Movements like Fluxus and "Art and technology" were important formative influences on Paik's work. As Drucker puts it, in the 1960s and 1970s,

A serious rethinking of the very idea of "art" appeared on the edge of radical transformation.... Experience-based rather than object-based work sprang up in one location after another.... The concepts of interactivity, algorithmic processes and networked conditions were not fully distilled as principles of digital art until recently, but their broad outlines were apparent by the 1970s [40].

Like many other recent historians (Manovich, Grau, Gere), Drucker sees important precursors not only to the new media art of the 1990s and after, but also to the entire landscape of "network culture" and the "network society" (Castells) in the avant-garde work of the 1960s and 1970s. Historians of the "information economy" trace many fundamental structural changes in the capitalist mode of production to the period — the 1960s and 1970s — when postformalist art was taking shape, when the postwar economic system collapsed, and when Western economies became more geared to the production of "immaterial" goods such as services and information.<sup>4</sup> As we shall see, these transformations were not lost on artists or theorists working at the time. Postformalist tendencies were, for a time in the 1960s and 1970s, present in a range of artworks engaged with technology, the possibilities of offering viewers a new, participatory place in the artwork, and the construction of systems rather than objects. This idea of the artwork as a set of conditions that lies in wait for the audience's intervention, and which is only determined by way of that intervention, is increasingly familiar in scholarly and critical approaches to new media art, and art more generally.

Art historians credit Paik as a central figure in the Fluxus movement (Popper, Smith, Drucker). As a network, Fluxus was active from the late 1950s, most visible in the 1960s and 1970s, and formally has never ceased to exist. At least rhetorically, the movement is less about its individual members than about certain crucial ideas and methods (Smith). These central ideas include "first, the primacy of the event (or act), with a correlated concern for

participation, and second, a centrality of information exchange, modeling and education" (Smith 122). A more specific account of Fluxus's underlying principles is given by Fluxus artist Ken Friedman, who has written an intellectual history of Fluxus, "Forty Years of Fluxus," and edited the *Fluxus Reader*. Friedman sees Fluxus as having been a "laboratory" in which

The research program ... is characterized by twelve ideas: globalism; the unity of art and life; intermedia; experimentalism; chance; playfulness; simplicity; implicativeness; exemplativism; specificity; presence in time; and musicality [2002].

For Friedman, these principles underlie the whole variety of Fluxus's output, from performances to musical compositions to later experiments with forms such as mail art.

Several of these principles can be usefully considered in relation to Paik's TV works (and, later in this chapter, in relation to video games). The first idea, of the *unity of art and life*, underpins Fluxus's attempt to demystify the art object, the figure of the artist, and the system of art itself. There is a resemblance here between Fluxus and contemporary developments such as Pop Art, which attempt to efface or question the distinctions between art and commercial culture. The boundaries between the auratic art object and the everyday outputs of mass consumer culture are confused by *Zen for TV*'s combination of painterly visual abstraction and a sacred reference, on the one hand, and Paik's playful technique and use of television on the other. With *Participation TV*, there is a deliberate confusion between acts of artistic creation and the participatory acts of the artwork's audience. Moreover, in Paik's practice there is an integration of engineering practice and aesthetic image-making. *Participation TV* fulfils the criterion of *intermedia*, mixing real-time sound, real-time vision, an electronic visual technique, and the "found object" of the television set itself. *Zen for TV* and *Participation TV* alike embrace *simplicity*, for which "Another term ... is elegance. In mathematics or science, an elegant idea is that idea which expresses the fullest possible series of meanings in the most concentrated possible statement" (Friedman 2002). *Zen for TV*'s density of reference (to religion, Modernism, popular culture), its indication of the possibilities for new uses of television, its conceptual daring in staking out a new area of artistic practice, and its beauty are all remarkable in a work produced with such a simple expedient. And though *Participation TV*'s apparent simplicity belies Paik's immersion in electronics prior to making the artwork, it introduces real-time electronic images, electronically mediated interactions, and a simultaneous critique and extension of the uses of television.

The fact that all of this is so clearly legible in these works may be because of their *exemplativism*, the Fluxus antidote to what they saw as the Gnostic

complexities of art criticism, "[which] is the quality of a work exemplifying the theory and meaning of its construction" (Friedman 2002). The meanings of these works are not concealed in depth, and require no specialized critical knowledge to understand, but they are revealed clearly in the titles, on the surfaces, and crucially in the use of the works. With *Participation TV*, meaning, as in Wittgenstein's view of language, seems to overlap extensively with use (2001).

Perhaps most important of all the Fluxus principles underlying Paik's TV works is that of *playfulness*. Friedman describes the function of this idea in Fluxus artworks: "Playfulness has been part of Fluxus since the beginning. Part of the concept of playfulness has been represented by terms such as jokes, games, puzzles and gags" (2002). This playfulness was more than just a rejection of the fetishization of art objects and artistic practice that led to the "rigidities of conception, form and style" (Friedman 2002) that the Fluxus artists saw as characteristic of the late Modernist consensus they were reacting against. In positive terms it was seen as a new mode of comprehension within their artworks, which were not just "gags":

Play comprehends far more than humor. There is the play of ideas, the playfulness of free experimentation, the playfulness of free association and the play of paradigm shifting that are as common to scientific experiment as to pranks (Friedman 2002).

Playfulness, which interacts with the values of simplicity, the unity of art and life, and participation, is visible in the inclusiveness of individual Fluxus works, and of the movement as a whole:

Of the multitude of directions and ideas that Fluxus has explored, the most significant one is that it models a way of being creative that offers a communal, participatory and open-ended alternative to the traditional forms and functions of art-making.... By rejecting both the romanticized frames of art as visionary and the modernist notions of art as professional and exclusionary practice, Fluxus returns to a simpler engagement open to all.... In this way, art becomes a social act, because of its participatory nature, and transformative as well, because of this very same inclusionary stance. Although this open, often seemingly uncritical and playful aspect of Fluxus is sometimes dismissed as insignificant or lacking a serious motivation, it is of fundamental import for a collective, collaborative and global-based mentality [Smith 123].

The playfulness of the television works can be seen in terms of Paik's own relationship with his materials, and in his willingness to experiment with television. *Participation TV* extends playfulness to the viewing audience — this is a work whose playfulness is explicitly social and inclusive, comprehensible not through initiation into the professional secrets of late Modernism but through experiential play. In terms of the distinction between *paidea* (roughly:

play) and *ludus* (roughly: game), originating in the work of Caillois, and so important to early debates in videogame studies, Paik and Fluxus's versions of play are firmly in the former category. This is not rule-bound, competitive play, but open-ended experimentation on Paik's part, or in the case of *Participation TV*, an invitation to the audience to engage in similarly open playful experiences.

This "rethinking" of the nature and possibilities of the artwork as *experience* was dubbed "postformalism" by a late 1960s artist and theorist, Jack Burnham, and the description is taken up by Drucker when she observes that:

The critical vocabulary of postformalism is sprinkled with terms and phrases that call attention to this change from object-based to process-oriented work. The earlier-twentieth-century notion of the "languages of art," for instance, was replaced by reference to "systems." "Processes" became more significant than mere "objects." And the vocabulary of "operations" or "procedures" appears in work with and without technological components, as if the linguistic phraseology of a technological mode were the new lingua franca of conception and production. An overall emphasis on dynamic manipulation of knowledge (again, "the idea is a machine that makes art") replaces the long-standing legacy of "resistance in material" as the condition for a work's coming into being in form [48].

Rather than the objective artwork emerging from the artist's heroic struggle with their materials, artists now put in place processes, procedures, and relationships. This informs a range of contemporary art:

The moment of the work's intended mutability through the user's input represents a paradigm change in artistic production. Artists now provide a certain framework for action and define the esthetic parameters within which the user can operate; the work itself is a variable [Pfaffenbichler 2004].

The object disappears: it is no more than a "variable" and "mutable" element within the framework that determines its parameters and the parameters of users' actions upon it. The artist is no longer a producer of finished objects, but a producer of affordances, constraints, and fields of action.

The notion of systemic artworks, first proposed by art theorist Jack Burnham in 1968 in "*System Esthetics*," is one that makes room for a flexible discussion of the relationship between players/viewers, technologies, and the audiovisual spaces created in work such as Paik's, and which, further, can inform our discussion of video games. Burnham compared the new orientation toward systems to a Kuhnian paradigm-shift in the sciences. He insisted on its close relationships to the changes he already saw emerging in the West's capitalist economies, where the management of systems and information was increasingly important, and the production of tangible goods was relatively less important. These changes in the artwork were reflective of broad changes in society as a whole: "We are now in transition from an *object-oriented* to a

*systems-oriented* culture. Here, change emanates not from *things*, but from the *way things are done*" (Burnham 1978: 160). According to Burnham, systemic practices are focused on the "creation of stable, on-going relationships between organic and nonorganic systems"; he identified these with the military-industrial development of systems analysis, claiming that the aesthetic impulse must, as technology progresses, "identify itself with the means of research and production" (162). He identifies informing trends in twentieth-century art whereby Marcel Duchamp and others showed that "art does not reside in material entities, but in relations between people and the components of their environment" (162). He sees art freed from the production of objects as an art that can take its place in a variety of contexts.

This opens the way for considering the artwork as a system of relationships, and as a process or a set of possibilities rather than as a fixed object. For Charlie Gere, Burnham's work amounts to a reconception of art that provides the basis for an understanding of creative practice as no longer focused on the production of self-sufficient objects, conceptually removed from the stream of time, to a view of art as "software." A similar conception of artistic practice as software — a product of design by the artist that allows the user certain actions and behaviors — recurs in Lev Manovich's recent notion of information design and information behavior as "post-media" aesthetic categories.

The context of a broad postformalism, which saw the aim of artists as the production of processes, procedures, relationships, and mutable fields that registered users' configurative practices of the principles of the Fluxus movement and of theories of "systemic artworks" such as Burnham's, can all be used to frame Paik's TV works. Further, these concepts are also useful in understanding and analyzing the development and aesthetics of the earliest, commercially available video games which, though they appear subsequent to Paik's works, have a history that stretches back beyond Paik's first exhibition, giving further evidence of the breadth of the aesthetic ambition to create systemic works that left a participatory place for the user or viewer.

### *Ralph Baer, Television and the Third Spot*

A decade before Paik's work appeared, an engineer named Ralph Baer began working on his own problem, which bore close resemblances to Paik's and whose ambitions Baer articulated in similar ways, but whose outcomes had important differences. At a time when television, as a channel of broadcasting, was making its most forceful contribution as a vector of "mobile privatization," and operating so centrally in the postwar reconfiguration of the



American (sub)urban landscape (Spigel 2001), Baer, like Paik, was trying to develop a means for fragmenting the publicity and simultaneity embedded in TV's hegemonic uses, its institutional frameworks, and its address. In the early 1950s, Baer worked with Loral, then a small electronics company. His chief engineer put Baer and a colleague to work on designing a home television set, with the instruction to make it "the best TV set in the world" (Baer). Baer immediately suggested building games into the sets. His idea was rejected by his supervisor, and he was only able to devote serious time and resources to it from 1966, when he himself was a chief engineer at military contractor Sanders Associates. In the meantime, though, Baer recalls that:

I had frequently been thinking about ways to use a TV set for something other than watching standard broadcasts. There were about 40 million TV sets in the USA alone at that time, to say nothing of those many more millions of sets in the rest of the world. They were literally begging to be used for something other than watching commercial television broadcasts!

Here, Baer's intimate knowledge of television electronics and his scientific and creative ambitions caused him to conceive of TV and its domestic presence in a way that is tantalizingly similar to Paik's. For both, television was not so much a fixed medium as it was a ready-made technological infrastructure, which might allow an ecology of varying uses, the insertion of parallel and parasitic technologies, and a plurality of relationships with its screen. Though they have this view of television in common, it is worth noting that Baer's expression of this view is far less critical than Paik's: he wants these games to be an addition or supplement to broadcasting, rather than aiming to replace television for a radical purpose. Varying television's uses is less a political or critical project than an engineering challenge.

For Baer, the transformation is defined primarily as a technical problem, but Oliver Grau's reminder to us is important here: that where the "media artist" is concerned, scientific and aesthetic problems are difficult to unpick, and we need to remind ourselves of Paik's electronics learning curve leading to his early TV works and Baer's struggle with the aesthetics of play, detailed below. However Baer conceived his practice, it was his work rather than Paik's that more directly led to a wholesale variation in the uses of television. His self-conception as more "engineer" than "artist" allowed him to consider the articulation of his work with the institutions and apparatuses of consumer culture — mass production, mass distribution, and retailing — that would deliver it into ordinary households.

From 1966, Baer's notes show him mapping out ideas for a "range of low cost data entry devices which can be used by an operator to communicate with a monochrome or color TV set of a standard, commercial, unmodified type." This is strikingly similar to what Paik achieves in *Participation TV*, but

Baer's ambition has subtle differences in its direction. He considers different possible means of connecting games machines with television: different kinds of games ("Action games ... Board skill games ... Artistic games ... Instructional games ... Board chance games ... Card games ... Sports games...") (Baer)), with different kinds, and different levels, of interaction. Importantly, what is implied in his plans is a retention of television's capacities as a *representational* medium, a consideration to which we will return.

There was a long period in which Baer and engineers under his supervision tinkered with the problems of "TV games." Working initially with valve-state electronics, he worked on devices that would produce manipulable television images. His experiments with controllers and transmission yielded one moveable spot, then two, and his first game, *Fox and Hounds*, which worked on the principle of tag. Ongoing involvement by engineers like Bill Rusch led to the concept of a "third spot":

[which] was born sometime in October or November [1967]; unlike the two manually controlled spots we had been using so far, this spot was to be machine-controlled. Bill Rusch came up with the idea of making that spot into a "ball" so that we could play some sort of ball game with it. We batted around ideas of how we could implement games such as Ping-Pong, Hockey, Football and other sports games. I am not sure that we recognized that we had crossed a watershed but that's what it amounted to [Baer].

By the end of 1967 Baer had built and tested prototypes, including one for a light gun that could be used in play, and one for the "ping pong" game, and by 1968 had filed patents, which were finally issued in 1971 for a "Television gaming and training apparatus." The "ping-pong" game was developed with engineers at Sanders Associates, demonstrated in 1967 before Baer's patents were filed, and by 1968 was incorporated in a "complete switch-programmable video game unit capable of playing ping-pong, volley-ball, football, gun games and using colored, transparent overlays as backgrounds" (Baer). Baer modified this design further to create the "brown box," which was the "first fully-programmable, multi-player video game unit." This was displayed to American television manufacturers in 1968, picked up and dropped by RCA, and finally accepted for manufacture by Magnavox in 1971 (Baer, Winter). In the prototype, and in the eventual commercial release, player movement, and the range of actions the player's avatar could take in the visual world of the game was produced and limited by a range of controllers — a dial and the light gun. Baer's essential design was to be issued as the Magnavox Odyssey in 1972. It toured trade shows with the "Magnavox profit caravan" in 1972, and this is how Nolan Bushnell came to play it, and sign the firm's guestbook at the Airport Marina Hotel in Burlingame, California (Baer).

Like Paik, Baer's efforts involve an immersion in electronics, an effort

to turn the television screen to new purposes, and the desire to create a “post-objective” work using television technology, in the sense that his efforts are directed at the production of a system of interaction rather than pictorial works with a comparable level of sophistication to those of broadcasting. Like the postobjective artworks discussed by Drucker and Gere above, processes, systems, and frameworks for action are the goal of practice. The significance of the “third spot” was not so much in its minimal enrichment of the screen image, but in its bringing about a more satisfactory relationship between the image and the behavior of users in relationship with it. This is not a finished, objective work, like a broadcast television program, that viewers can watch and interpret but not change. This is a new form of “information design,” which has as its primary goal a new form of “information behavior” in relation to television (Manovich). In this sense, we can think about Baer’s work in relation to the movement toward postobjective creative practice in the 1960s and 1970s.

Baer did not talk about his work in precisely the same way as Paik, but we can see the early Odyssey games as embodying some of the Fluxus principles that explicitly inform Paik’s TV works. Baer’s games are “intermedia” in the sense that they combine electronic images, transparent overlays, and games themselves in a new kind of cultural product. It offers a “unity of art and life” in the sense that just as Paik and Fluxus look to dismantle the barriers between art and audience, and offer televisual images as something the audience might act upon. Baer clearly expresses a desire to give the technology of television over to local uses, and thus at least implicitly is prepared to complicate the centralized apparatus of broadcasting. (Certainly, the ongoing consequences of Baer’s work—including the global videogames industry—have played their part in the formation of what has been called the “post broadcast age” [Wark]). The work is certainly, centrally “playful,” but there are important differences with the quality of playfulness we find in *Participation TV*. This can be seen in the way that Baer does not stop with *Fox and Hounds*. Baer’s goal is not the institution of unstructured *paidea* play, but the construction of a structured *ludus* game, on the dimension of *agon*, or competitive play, and in retrospect Baer identifies the construction of a viable form of agonistic play as the moment of success. A collaboratively produced image is enough for Paik in designing *Participation TV*; Baer considers his team’s key achievement to be the organization of a viable form of competition in interaction.

Also, importantly, there are differences in the function of images in Baer’s and Paik’s work. Paik’s images can be enjoyed on several levels—we can appreciate *Zen for TV*’s allusion to high modernism; *Magnet TV*’s beauty and complexity; *Participation TV*’s relationship to the human voice. But none of these

images are truly representational, and indeed only exist as the surface evidence of a conceptual transformation of television’s possibilities. Though *Zen for TV* alludes to Barnett Newman and religion, the image is there as a bare sign of the manipulability of television by the artist. The variable image in *Participation TV* is no more than a variable that demonstrates the application of the conceptual title: though the abstract images produced have their own pleasures, they do not represent anything except the results of participation. To paraphrase Galloway, the images here are no more than **interaction made visible**. But in Baer’s games, images and play are thought about by analogy with existing games, and part of Baer’s satisfaction with the “third spot” is due to the game’s approximation of tennis; there is a newfound capacity for *representing* something in the world. This representational ambition informed the journey made by Nolan Bushnell to producing the first commercially successful videogame, *Pong*.

### Nolan Bushnell: Computer Space to Pong

Nolan Bushnell’s newly formed Atari released *Pong* in 1972. Its often-remarked commercial success followed the failure of Bushnell’s attempt to port *Spacewar!*—designed by Steve Russell and others for MIT’s PDP-1 mainframe computer from 1961—to a cheaper, more accessible arcade format in the form of *Computer Space*.<sup>5</sup> The port was simplified, for example, there were no gravity effects as in the mainframe version, but was perhaps not straightforward enough to make it the popular success that *Pong* would be. Whereas the later game would simply require players to move their avatar on a single axis of movement in order to meet the oncoming “ball,” the description of *Computer Space*’s gameplay on its Killer List of Videogames listing gives some indication as to what the first players were faced with:

The rocket ship controlled by the player can be maneuvered through space using rotational buttons and a thrust button. The fire button is used to make the rocket ship fire missiles. When the two enemy flying saucers attack, they will fire missiles at the rocket ship. The player must have the rocket ship fire missiles at the flying saucers to destroy them. The object of the game is for the player to have the rocket ship to destroy the flying saucers more times than the flying saucers can destroy the rocket ship, the player must also try to have the rocket ship outscore the flying saucers in order to get extended play in hyperspace. If the player attains hyperspace the playfield will turn from black to white and feature a vision of daylight in outer space. The game will end if the flying saucers outscore the player’s rocket ship and time has expired.<sup>6</sup>

In retrospect, Bushnell recalled the problems with *Computer Space*:

You had to read the instructions before you could play, people didn’t want to read instructions. To be successful, I had to come up with a game people already knew how to play; something so simple that any drunk in any bar could play [Winter].

We can put Bushnell's articulation of the problem he faced alongside Paik's or Baer's: he sees using television as the basis of a new form of play as more engineering problem than critical project, but there is also a decidedly entrepreneurial, commercial edge to his ambitions. Nevertheless, he found his way through some aesthetic problems that had to do with visualization and the range of information behaviors required of players. Beyond Bushnell's own retrospective assessment, Lowood remarks that the idea that *Computer Space* was too complex for its players is a consensus judgment in videogame history (11), but that this needs to be qualified by the technical and design achievements that *Computer Space* did embody, and which were carried forward into the later success of *Pong*, and arcade gameplay:

These assessments of *Computer Space* as a failure miss its significance for the videogame as a technological artifact. It provided more than a learning experience. *Computer Space* established a design philosophy and general technical configuration for arcade consoles and reduced the laboratory-based computer game to the stable format that would launch the videogame as a consumer product. When Bushnell noted years later that his "engineering friends loved" *Computer Space*, even if "the typical guy in the bar" was completely baffled, it is easy to hear echoes of this appreciation in assessments of his *technical* achievement from engineers, designers and operators [Lowood 11–12].

This "technical configuration" included the placement of a television screen at the heart of a commercial coin-op videogame system, within a cabinet, and the grasping of the possible analogies between computer games and older coin-op amusements. Lowood offers an example of the technical achievements in *Computer Space* that would continue to inform subsequent videogame design. Bushnell's technical solution to the problem of overburdening a CPU with refreshing an entire screen every time a single on-screen object moved was to control each individual game element with a dedicated transistor:

Bushnell's rockets were essentially hardwired bit-maps that could be moved around the screen independently of the background, a crucial innovation that made it possible to produce screen images efficiently.... The design concept would become part of Atari's shared knowledge.... Bushnell's patch solution later became a staple of game machines and home computers in the form of "sprites" [Lowood 1].

Notwithstanding its achievements in arriving at a basic format for arcade play, and in making crucial technical gains that would be taken forward into the design of *Pong*, as a game, *Computer Space* undoubtedly deterred player engagement because of its complexity. At a time when "computer literacy" was the preserve of engineering faculties, it asked players to learn and understand at once a wide range of information and information behavior, including new

kinds of images, and a complex way of enacting relationships with images. The problem of how to attract players beyond the engineering community to engage with a new medium was solved only with the much simpler *Pong*.

Perhaps Bushnell's inspiration for the solution to his central problem did come from his visit to Magnavox's "profit caravan" where he saw a demonstration of the *Odyssey*; Bushnell admits attending the show but claims to have been unimpressed by Baer's efforts. *Pong* was released several months after the *Odyssey*, but it thoroughly eclipsed what even Baer describes as his machine's "modest" sales. Successful legal action was brought by Magnavox on Atari in 1973 (Winter). By this time, though, Atari had entrenched itself as market leader, and although the *Odyssey* sold well, it is *Pong* that is remembered as the first computerized tennis game, and the first successful video game to reach a broad market.

As noted by Lowood, *Pong's* success is usually put down to its relative simplicity by comparison with *Computer Space* (Winter, Herman, and Cohen). The simplicity of the game is not only in its simple imperatives, but also in the instructions and the character of the images and their movement in space. By contrast with *Computer Space*, *Pong's* instructions were almost absurdly simple: "Avoid missing ball for high score." Given that there is no "ball," but only a blocky sprite rebounding around the screen, we could see these instructions as being as much a fictional framing device as an outline of imperatives.

The physical interface was equally uncomplicated. A continuous dial controlled movement of the player's block avatar on a single, vertical axis. Unlike *Computer Space*, there were no "expressive acts" (Galloway) such as firing, and the player was only required to engage in movement-actions. A two-player game — with no computer-controlled avatars — the game allowed players to participate in a very straightforward contest in on-screen space, and the adversarial nature of the contest was reflected in the neat, symmetrical composition of the screen. Squire and Jenkins's doctrine of video games as the "art of contested space" is spelled out very clearly by the game to players: the game's written instructions and the visual composition of the game's world allow the "rules" to emerge easily, to the extent that we might see those rules as being realized representationally. The contestual nature of the game is clearly legible, in a way that, using the vocabulary of Fluxus, we might call exemplative. Whereas *Computer Space* "required instructions," *Pong visualized* its rules.

The ease with which players were able to understand the required information behaviors in relation to the game was shown when a prototype was installed in Andy Capp's tavern:

One of [them] inserted a quarter. There was a beep. The game had begun. They watched dumbfoundedly as the ball appeared alternately on one side of the screen

and then disappeared on the other. Each time it did the score changed. The score was tied at 3–3 when one player tried the knob controlling the paddle at his end of the screen. The score was 5–4, his favor, when his paddle made contact with the ball. There was a beautifully resonant “pong” sound, and the ball bounced back to the other side of the screen. 6–4. At 8–4 the second player figured out how to use his paddle. They had their first brief volley just before the score was 11–5 and the game was over. Seven quarters later they were having extended volleys, and the constant *pong* noise was attracting the curiosity of others at the bar. Before closing, everybody in the bar had played the game [Cohen 29].

Where *Computer Space*'s structure was complex enough to resist the player's entrance with a range of behaviors and instructions that needed to be understood, *Pong* presented a system in which the relationship between the playing body and screen images, mediated by the simple dial interface, was such that players were quickly able to attend to it, and quickly able, too, to derive pleasure from competitive play. And already, in Cohen's description, it is interesting to note that, just as Paik's works implied a bifurcated audience, on *Pong*'s first night the audience is divided between players and spectators, as in Newman's analysis of the complex videogame audience. In this case, viewers are not attracted by the kind of rich technological spectacle that characterizes contemporary games, and the audiovisual style of *Pong* is a long way from the mimetic audiovisuality of television. The spectacle here is a new form of agonistic play, witnessing a new form of technological representation. In this sense, perhaps, *Pong* shares at least one aspect of the “aesthetic of attractions” that Gunning insists underpins early cinema: its attraction lies partly in “its ability to show something” not only new (52), namely, electronically generated images, but also in its ability to show something *as* manipulable and subject to agonistic play.

By comparison with *Computer Space*, it is striking that *Pong* adds very little to the image of *Zen for TV*. *Pong*'s abstraction of tennis is of such rigor as to constitute the zero degree of representation. It seems to confirm Wolf's argument that the abstraction of early video games is a means by which players are “taught” about the nature of the new medium. But it is representation nevertheless, and, taking Järvinen's framework for analyzing audiovisual style in early video games forward, it is less “abstract” than “caricatural”—it is an extremely schematic representational audiovisual environment rather than one, like Paik's (or that of *Qix* or *Tetris*) that eschews representation. Perhaps it is the balance found in *Pong* between representational ambition and the necessity to initiate players into new kinds of information behavior that marks its success as videogames' first “killer app.”

### Conclusion: Archaeology and Pong as Killer App

The expansion of videogame archaeology can enrich our understandings of gameplay, of the successes and achievements of game designers, and the consequent transformations of media technologies and institutions. That Paik never really achieved his goal of a critical renovation of television, and that Baer and Bushnell were able to initiate a new industry that transformed our relationship with television as a technology, can be understood in terms of an archaeological analysis.

Despite Paik's wonderfully elegant institution of postobjective artworks with television at their heart, he was prevented perhaps by his critical position, and his “anti-television” stance, from offering his works as a mass-market technology. For all of Fluxus's desire to take art into the world, the institutional framework for his TV works remained the art gallery and his methods remained artisanal, so the audience for these works was significantly smaller than television's mass audience.

The “modest success” of the *Odyssey* beside *Pong* has been explained by Baer in terms of the confusion and incompetence of Magnavox and retailers in marketing the machine, but the positioning of all of these efforts in relation to the technology and institutions of television in the archaeology that this piece has carried out suggests a different possibility. Given that broadcasting was, as Paik, Spigel (1992), and Williams suggest, a crucial component of the postwar social order, any technology that threatened to break the nexus between broadcasting and television could be seen as a change with broad ramifications. Winston, in his history of media technologies, suggests that new technologies are subject to a law of suppression of radical potential: societies tend toward conservatism, and new technologies that threaten elements of the status quo are problematic, and often take time to gain acceptance and to become institutionalized. Given that Williams's social history of gaming shows that, notwithstanding some successful consoles, it was not until the late 1980s that consoles came to reliably outstrip arcades as a source of revenues for the videogames industry, it could be concluded that Baer's machine, and succeeding consoles, represented too disturbing a change to domestic media consumption.

Bushnell, on the other hand, opted initially for the placement of games in public space, where, as Huhtamo shows, a range of venues, established patterns of consumption and reception, and an economic model of sales and distribution were already in place, ahead of the arrival of arcade games. Huhtamo's archaeology demonstrates that for a long period video games and arcade machines could be seen side by side in arcades, bars, and other venues, comfortably coexisting, accepting the same coins, and offering analogous

human-machine relationships. Winston claims that media technologies are usually taken up because they fulfill a “social need”: in this case, the coin-op industry’s hunger for technological novelty. Rather than changing domestic media consumption, at least initially, Bushnell was more concerned to incorporate the technology of television into a new form of coin-op play, which, though inspired by his experiences with advanced computer technologies, was also informed by his understanding of that industry. *Pong*’s status as a “killer app” was in part secured by the cultural and economic framework into which it was introduced.

However, all three can be seen as manifestations of a common desire to turn television to new uses, to encourage new kinds of information behavior in relation to screen images; Paik, Baer, and Bushnell alike conceived of television as not merely a receiver of broadcast content, but in terms of its new potentiality as the center of postobjective, systemic works. Though Paik’s work is abstract and Baer and Bushnell’s representational, and though *Participation TV* offers open-ended play whereas the game designers’ works are structured by agonistic competition, all imagine television transformed, in a new relationship with its audience. The framework within which Burnham and subsequent historians understood the changes in the nature of art in the period that overlaps with the videogame designers’ work can be fruitful in understanding games and art, and a present where real-time interaction has come to “underpin the whole apparatus of communication and data-processing by which our contemporary techno-culture operates” (Gere 1). From this point of view, we can begin to understand the relationship between games and art with frameworks that transcend simple oppositions.

### Notes

1. See, for example, Ellis.
2. See Wilson for a fuller account of the relationship between the work of Newman and Paik.
3. Ivan Sutherland’s PhD incorporating Sketchpad, the first graphical user interface (GUI) for computers, was published in 1963, and the technology allowed the production of on-screen line drawings of considerable complexity, but these efforts were directed at monitors attached to large, mainframe computers.
4. See, for example, Cohen, and Castells.
5. See, for example, Burnham 2001, Cohen, and Winter.
6. A mastery of a number of rules, various functionalities and behaviors of on-screen objects, and a range of narrative events were all part and parcel of playing this game. The game demanded that the players learn to use different kinds of controllers, both for the “move-acts,” which “change the position or orientation of the game environment” and “expressive acts,” which “exert an expressive desire outward from the player to objects in the world” (Galloway 22–23). To move in *Computer Space*, the player must understand

the interplay of directional and thrust controllers, and the relationship between their actions and an unfamiliar on-screen object. Expressively, the player must understand the requirement to target and fire at other objects. Added to this was a mise-en-scene which was arguably richer than any other videogame between it and *Space Invaders*, featuring a background of stars and several differently-shaped objects (the rocketship, the flying saucer, the projectiles). A two-player version introduce further complications, with players controlling differently-shaped craft with varying capabilities.

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