Published in:
Handbook of Computer Games Studies, edited by Joost Raessens & Jeffrey Goldstein, Cambridge, Mass.: The MIT Press, 2005.

Erkki Huhtamo

Slots of Fun, Slots of Trouble

An Archaeology of Arcade Gaming[1]

By gosh – it is a pinball machine!
- Steve "Slug" Russell, one of the creators of *Spacewar*

In *The Pilgrim in the Microworld* (1983), an early, unjustly neglected analysis of electronic gaming, the sosiologist and musician David Sudnow compares his struggle to master *Breakout* with an Atari home videogame console to his longterm efforts to learn to play the piano[2]:

"Before, the piano was the quintessential human instrument. Of all things exterior to the body, in its every detail it most enables our digital capacities to sequence delicate actions. Pushing the hand to its anatomical limit, it forces the development of strength and independence of movement for fourth and fifth fingers, for no other tool or task so deeply needed. This piano invites hands to fully live up to the huge amount of brain matter with which they participate, more there for them than any other body part. At

[1] The concepts "electronic games" and "electronic gaming" are used in this article as conceptual umbrellas, covering phenomena variously referred to as "arcade games", "videogames", "console games", "TV games" and "computer games". There is much confusion in the the use of terminology. By "arcade games" I understand stand-alone games (enclosed in dedicated cabinets) played in public arcades or or locations. By "videogames" I mean games played with a dedicated console connected with a CRT, most often a TV set. The concepts "console game" and "TV game" are more or less synonymous with a "videogame". The concept "TV game" (telebi geimu) is frequently used in Japan. A "computer game" is a game played with the personal computer, either off-line or on-line. There is much overlapping between these categories; numerous games are available both for arcades, consoles and PC's. An alternative to "electronic games" could be "digital games", but the first mentioned seems culturally more established. The leading industry event on the the field is known as Electronic Entertainment Expo (E3, Los Angeles) which is organized by the Interactive Digital Software Association (IDSA). This seems to further emphasize the interchangeability of the words "electronic" and "digital" (although they by no means mean the same thing). The industry has more and more often shown signs of replacing the word "games" with "entertainment".

[2] Breakout was first released as an arcade game by Atari in 1976 and later as a console version. According to a well known story, it is said to have been designed in four days and nights by Steve Wozniak at the request of his friend, the Atari employee Steve Jobs. Jobs had been given the task of designing a new game in the tradition of Pong by Atari's founder Nolan Bushnell. The purpose of the game was to destroy a brick wall (on the top part of the screen) by slowly knocking out the bricks one by one by means of a paddle moving horisontally in the bottom of the screen. Jobs and Wozniak became founders of Apple Computer. (see Van Burnham: Supercade. A visual history of the videogame age 1971-1984, Cambridge, Mass.: The MIT Press, 2001, p.137). About the legends around the making of Breakout, see also Steven L. Kent: The Ultimate History of Video Games, Roseville, California: Prima Publishing, 2001, pp. 71-73.

this genetically predestined instrument we thoroughly encircle ourselves within the finest capabilities of the organ."[3]

Sudnow's encounter with videogames, which soon developed into an addiction, gave an impetus to a book which is unique. It is still the most detailed description of the psycho-physical bind created between the player and the game (and, by implication, the user and the computer). Hardcore gamers rarely feel the need to conceptualize their experiences. Sudnow, however, does exactly this, profiting from his double background as an academic researcher of social interactions and a jazz pianist.[4] His detailed account is a mixture between a diary of addiction and recovery, a phenomenological study, and a self-referential literary work, reminiscent -- as Grahame Weinbren has suggested -- of Samuel Beckett.[5] Sudnow makes intriquing observations about the medium that had come to preoccupy his mind and his fingers so unexpectedly:

"Punctuate a moving picture? I'm no painter and don't dance in mirrors. But here I could watch a mysterious transformation of my movements taking place on the other side of the room, my own participation in the animated interface unfolding in an extraordinary spectacle of lights, colors, and sounds. Improvised painting, organized doodling, with somebody doodling against you to make sure you keep doing it."[6]

Although primarily concerned with describing and analyzing the author's own relationship with *Breakout*, *The Pilgrim in the Microworld* also inspires the reader to think about the cultural background of electronic gaming. For if human history has been cultivated, as Sudnow suggests, "through speech and the motions of fingers...the tiniest not biggest actions", videogaming may not be an unprecedented phenomenon. At the very least, it would be linked with the tradition of using keyboards, from playing the piano to tapping the keys of a "Hughes machine" (a telegraphic apparatus with piano-like keyboard) or the typewriter. However, Sudnow does not elaborate on the historical and cultural ramifications of his observation. In fact, the "keyboard tradition" can be considered part of a wider phenomenon, that of interfacing humans with artefacts of all kinds. Although the history of such interfacing goes back thousands of years, its significance began to grow enormously in the 19th century as a result of the industrial revolution and its social, economic and cultural consequences. The introduction of large-scale machine production was accompanied by an avalanche of different devices that provided amusement, including gameplay. Although often mechanically simple (at least if judged against 21st century standards), and limited in

---

[3] David Sudnow: Pilgrim in the Microworld. Eye, Mind, and the Essence of Video Skill, New York: Warner Books, 1983.

[4] Before Pilgrim in the Microworld, Sudnow had already edited an academic anthology called Studies in Social Interaction (New York: The Free Press, 1972) and written the highly acclaimed Ways of the Hand. The Organization of Improvised Conduct (Cambridge, Mass.: The Harvard University Press, 1978). In this book, anticipating Pilgrim in the Microworld, Sudnow meticulously describes and conceptualises his process of learning to play the piano. In his motto Sudnow quotes Martin Heidegger: "Every motion of the hand in every one of its works carries itself through the element of thinking, every bearing of the hand bears itself in that element." (p. ix). Ways of the Hand has been recently re-published in a revised form as Ways of the Hand. A Rewritten Account (Cambridge, Mass.: The MIT Press, 2001) - Pilgrim in the Microworld would deserve to be reprinted as well.

[5] Grahame Weinbren: "Mastery (Sonic C'est Moi)", in New Screen Media: Cinema/Art/Narrative, edited by Martin Rieser and Andrea Zapp, London: BFI, 2002, p. 182. I would like to thank Grahame Weinbren for focusing my attention on Sudnow's book.

[6] Sudnow, op.cit., p.23.

their interactive potential, such devices prepared the ground for future applications such as electronic arcade games. How, why, when and where this happened is a challenge for scholars. What is needed is an "archaeology of gaming".

Looking Backward: Beyond Game History

This article is a contribution to 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. The existing literature on the history of videogames has done little towards achieving this goal. In fact, the (hi)story is usually told in a remarkably uniform fashion, built around the same landmarks, breakthroughs and founding fathers (not a word about mothers!). The history of coin-operated arcade videogames is routinely said to begin with the appearance of Nolan Bushnell's *Computer Space* (1971) and *Pong* (1972), that of home games with the introduction of *Magnavox Odyssey* (1972), the first videogame console for domestic use, conceived by Ralph Baer, with Bushnell another founding father.[7] The main predecessor to these landmarks has been identified in *Spacewar*, associated with the name of Steve "Slug" Russell, but actually created by a group of student-hackers at MIT in the early 1960s, and subsequently improved collectively by other students at the computer science departments of various American universities throughout the 60s.[8] The main argument concerning the "prehistory" of electronic games has centered around the status of *Spacewar* - was it really the first videogame? While most seem to agree, there are those who claim that this honor really belongs to a simulation called *Tennis for Two*, created on an analog computer by the physicist William Higinbotham at the Brookhaven National Laboratory in 1958.[9] Most game historians have also something to say about the emergence of computing as a precondition for the videogame phenomenon, yet few of them venture further than that. Stephen L. Kent includes a summary description of the history of mechanical arcade games in his massive volume *The Ultimate History of Videogames*, yet in most cases "prehistorical" information, if any, has been included "from duty", rather than from a critical urge to establish (and question) the links with the past.[10]

The current state of writing on game history could be called its "chronicle era". Books like Leonard Herman's Phoenix. The Fall and Rise of Videogames, Van Burnham's Supercade, Steven L. Kent's The Ultimate History of Videogames, and Rusel

---

[7] As an exception to the rule, DeMaria and Wilson refer to a coin-operated version of Spacewar called Galaxy War which appeared at Stanford University campus in the early 70s. The authors think the game may have been available even before Computer Space and Pong, which would make it the first arcade videogame. No conclusive evidence is given (Demaria and Wilson, 13). Bauer has recently written forewords to Van Burnham's Supercade (op.cit.) and to the anthology The Medium of the Video Game (edited by Mark J.P. Wolf, Austin: University of Texas Press, 2001) which further consolidates his mythologized status as a founding father.

[8] A valuable rare, early account about the culture around Spacewar is given by Stewart Brand in his II Cybernetic Frontiers, New York: Random House, 1994.

[9] Herman, 6-7; Burnham, 28; DeMaria and Wilson, 10-11. The game was displayed on a tiny oscilloscope screen and ran on an analog computer. Two special control boxes, predecessors of the joystick, were created. Kent dismisses the status of Higinbotham's game because it remained an isolated case and had no impact. It was not known by pioneers like Steven Russell (Spacewar) or Ralph Baer (Magnavox Odyssey) (Kent, 18).

[10] Steven L. Kent: The Ultimate History of Video Games, op.cit.

DeMaria's & Johnny I. Wilson's High Score! are mainly concerned with amassing and organizing data.[11] While Herman focuses on the development of game hardware, Van Burnham's overwhelmingly visual Supercade celebrates the games themselves, trying to delineate the elements of a "game aesthetics". DeMaria and Wilson have organized their volume around numerous "minihistories" of game companies. None of the histories published so far develops a critical and analytic attitude towards its subject. This can perhaps be explained by external factors. Game historians like Steven L. Kent, Leonard Herman and Van Burnham (introduced as a "videogame junkie" in the sleeve) are all roughly the same age (in their early 30s). They became familiar with electronic games in their childhoods in the 1970s. The same goes for J.C. Herz, Alain and Frédéric Le Diberder and Steven Poole, whose books deal with gaming history as well, although not as their main goal.[12] All these writers belong to the first generation that grew up with electronic games; for them gaming became a powerful formative experience. This is both their strength and their weakness. It is a strength, in that the writers are all gamers familiar with their field, and observing it with the eyes of a fan and an insider.[13] It is a weakness, in that they often lack critical distance to their topic and are unable to relate it to wider cultural framework(s), including contemporary media culture.

In this article I will excavate some cultural and historical issues relevant for a critical assessment of the emergence of games as an interactive medium. My main emphasis will be the background of electronic games as a manifestation of the human-machine relationship. Although I am fully aware of the complexity of electronic games as a cultural hybrid, I have chosen not to deal with certain of their historical "incredients", like motives from earlier forms of gaming and play and the oral and literary traditions of storytelling. As Gillian Skirrow pointed out in her pioneering study "Hellivision: an analysis of video games" (1986), ancient myths and fables often manifest themselves in games, both in their subject matter and their narrative deep structures.[14] This raises intricate questions about the migration of myths across time, space and various "media". It also leads to questions about the roles and functions of myths embodied in

---

[11] Kent's book is the most exhaustive chronicle to date, based on original interviews with over 500 game designers, producers and executives. It is a massive and detailed, albeit somewhat naive "polylogue" that relies to a great extend on direct quotations. Another data collection, focusing on arcade machines and games, is John Sellers: Arcade Fever. The Fan's Guide to the Golden Age of Video Games, Philadelphia and London: Running Press, 2001. The "fan" in the title quite clearly also addresses the author, who begins his Introduction: "I lost my video-game virginity at the age of six during an otherwise unmemorable afternoon at Cannonsburg Ski Area outside of Grand Rapids, Michigan. The game was Breakout, it was early 1977 and my mind was ready to explore the world beyond Mister Mouth and Hungry Hungry Hippos." (p. 10)The description has some affinities with discourses on religious conversion.

[12]The European contributors (Le Diberder and Poole) are easily the culturally and theoretically most sophisticated ones. They also devote some space to the European game industry, which is almost totally missing from the American-Japanese perspective of the American writers.

[13] As Mark J.P. Wolf has reminded, games are a difficult subject for study. While it is easy to view a film or a television program, going through all the levels of a videogame is a time consuming task, that requires practice and often special skills. See: The Medium of the Video Game, edited by Mark J. P. Wolf, Austin: University of Texas Press, 2001, p. 7. This may be one reason why so many early studies on electronic gaming kept a definitive distance to "hands-on" approaches, dealing with gaming as a general phenomenon,; at most, the researchers had peeped at the games from behind the gamers' (often children's) sholders.

[14] Gillian Skirrow: "Hellivision: an analysis of video games", High Theory/Low Culture. Analysing popular television and film, edited by Colin McCabe, Manchester: Manchester University Press, 1986, pp. 115-142.

games, literature, cinema and other cultural forms. I will leave these issues for cultural anthopologists and literary scholars to explore. Instead, I will present the outline of an archaeology of gaming in public spaces, particularly in game arcades. Thus I will leave issues like the domestic and nomadic (mobile, portable) gameplay to a future article. The interplay between public and domestic media consumption is an important issue that deserves a full treatment elsewhere. Although the same games are often adapted from one platform to another, the playing context makes a difference, influencing the nature of the experience, often in relation to other media forms.[15]

As an interactive medium, the roots of electronic gaming go back to the time of the industrial revolutions of the 19th and early 20th century. Connecting humans and machines was a central cultural, economic and social issue of the time. The introduction of machines as a new source of power and rationalized mass production led to an intense and long-lasting debate. An impressive overview of the dimensions of this debate is provided by Humphrey Jennings' *Pandemonium*, an extraordinary collage of textual fragments. The book tells the story of the coming of the machine entirely by means of quotations from contemporaries, realizing one of Walter Benjamin's dreams.[16] The use of machines for productive purposes in factories and offices provided a background for the appearance of other kinds of machines, meant for amusement and relaxation. To start with, I will sketch the cultural background for the emergence of these "useless" machines. I will then concentrate on the public amusement machines -- often known as coin-ops or slot machines -- dealing with their cultural roles and analyzing the modes of human-machine relations they introduced. There is a wealth of factual information available, thanks to collector-writers like Nic Costa and Richard M. Bueschel, but far less cultural analysis.[17] Very few writers have elaborated on the relationship between early coin-operated machines and video arcade games.[18]

In the final section I will reflect on the significance of these "media archaeological" findings for contemporary media culture and electronic gaming in particular, pointing out connecting links across the fabric of the 20th century culture. Although my emphasis is on the ways in which electronic gaming can be related to preceding cultural formations, I am not claiming that the "nature" of videogames could be exhaustively explained by the phenomena covered in this essay. There are other influential developments that have been left out, including the impact of the

---

[15] Sudnow found this out when he realized that Breakout, the game he had been attempting to master (to play it through repeatedly, based on his acquired mastery) on a home console, was originally an arcade game. An important principle behind arcade games is their "coin-op" logic: while depending on the gamer's mastery, the game also has to contain some randomizing factors that will increase the likelihood that the gamer needs to insert a new coin from time to time. In a sense Sudnow's quest for an absolute mastery of Breakout was misguided from the beginning, influenced by his background as a pianist. With piano, one can really learn to master a certain piece and repeat the performance over and over again.

[16] Humphrey Jennings: Pandemonium. The Coming of the Machine as seen by Contemporary Observers 1660-1886, London: Picador/Pan Books, 1987.

[17] For basic data, see Nic Costa: Automatic Pleasures. The History Of The Coin Machine, London: Kevin Francis Publishing Limited, 1988 (well written, but unfortunately not annotated), Richard M. Bueschel: Collector's Guide to Vintage Coin Machines, Atglen, PA: Schiffer Publishing Ltd, 1995; Richard M. Bueschel and Steve Gronowski: Arcade 1. Illustrated Historical Guide to Arcade Machines, , Volume 1, Wheat Ridge, Colorado: Hoflin Publishing Ltd., 1993; Marshall Fey: Slot Machines. A Pictorial History of the First 100 Years, Fifth Edition, Reno, Nevada: Liberty Belle Books, 1997 [1983].

[18] See, however, Rochelle Slovin: "Hot Circuits", in The Medium of the Video Game, edited by Mark J.P. Wolf, Austin: University of Texas Press, 2001, 139. Compare, Kent, 2-3.

technologies meant for domestic production and consumption. I am not trying to say that phenomena identified in contemporary media culture could be fully explained by looking towards the past. Electronic games and the roles they play in contemporary culture have much that is unique and unpredecented. Yet, to correctly assess their "uniqueness" media-archaeological excavations of the past may prove to be helpful. All cultural processes consist of interplay between continuity and rupture, similarity and difference, tradition and innovation; only their mutual proportions and emphases vary. Both dimensions should be taken into account in critical cultural analysis.

"The Animal Machine...Chained to the Iron Machine"

The notion of a close, near-symbiotic relationship between the human and the machine is often thought to be the product of contemporary culture, satureted by all kinds of devices, both stationary and mobile. As arguably the most widespread application of interactive media, electronic games may seem the ultimate fulfillment of this idea, both in good and in bad. Yet the discourse on linking humans with machines goes further back in time. When it emerged, it was often formulated in a negative sense, seen as a dark side effect of progress. The issue emerged in a world that was undergoing dramatic changes, related to industrialisation and mechanization. Beginning in the late 18th century, the introduction of steam-powered and mechanical machines into workshops and factories changed the nature of work.[19] In the earlier system of mercantile production, much work had been distibuted to skilled craftsmen, who could work from their homes. Not only did they retain their privacy, they could also more or less define their own working pace. With the new machinery, this relative independence disappeared. The workers were gathered at centralized factories where they had to submit themselves to the pre-defined rhythms and routines of the workplace. The value of skilled workforce began to diminish. Already in the early 19th century the factory itself was felt to turn into one huge machine, with the workers becaming its parts. Around 1815, visiting the mechanized shoe manufactory of "that eminent, modest, and persevering mechanic, M. Brunel", Sir Richard Phillips saw such a human-mechanical machine-hybrid in function:

"Every step in it is effected by the most elegant and precise machinery; while as each operation is performed by one hand, so each shoe passes through twenty-five hands, who complete from the hide, as supplied by the currier, a hundred pair of strong and well-finished shoes per day. All the details are performed by ingenious application of the mechanic powers, and all the parts are characterized by precision, uniformity, and accuracy. As each man performs but one step in the process, which implies no knowledge of what is done by those who go before or follow him, so the persons employed are not showmakers, but wounded soldiers, who are able to learn their duties in a few hours."[20]

Not only skilled, but even healthy workers were eliminated. Their role as "gears" in the factory-machine was given to crippled soldiers. In a way the machinery

---

[19] A classic account of this process is Siegfried Giedion's Mechanization takes Command. A Contribution to Anonymous History, New York: W.W.Norton, 1969 [1948].
[20] Sir Richard Phillips: A Morning Walk from London, 1817, cit. Jennings: Pandemonium, 137-138.

compensated for the deficiencies of their mutilated bodies, serving as a "prosthesis". While employing former soldiers could be interpreted as a philanthropic gesture, it might also have been motivated by purely economic motives: the idea of using the cheapest and the most loyal (stable) workforce available. Already in the first half of the 19th century social observers began to pay attention to the fact that workers were in the process of being turned into machines (or machine parts). James Phillips Kay wrote in 1832 about the working conditions in the cotton mills of Manchester: "Whilst the engine runs the people must work - men, women, and children are yoked together with iron and steam. The animal machine - breakable in the best case, subject to a thousand sources of suffering - is chained fast to the iron machine, which knows no suffering and no weariness..."[21]

"The animal machine..chained fast to the iron machine" appeared in other sectors of society as well. From the second half of the 19th century office workers were gradually subordinated to the principles of mechanization as well. They were forced to spend their time "tied" to new office machines - mechanical calculators, "electric pens" and typewriters, copying machines (or "mimeographs"), dictating machines, telephone switchboards. The workdays were divided into repetitive routines developed after the factory model. As Adrian Forty has explained, the new rationalized ideology of office work was "totalitarian" in nature and found expression on all levels from the largest to the smallest elements, including specially designed office furniture and "automated" timecard devices.[22] It is not surprising that the extensive linking of the human with the machine became the subject of fantasies and parodies. Devices like mechanical "shaving mills", torturing machine-like photographers' chairs and feeding machines for workers (featured later in Chaplin's *Modern Times*, 1936) were imagined. Eccentric applications inspired by the factory assembly line were proposed, often with a satirical touch. While some of them displayed liberatory potential, releasing the worker from one's toiling, most implied a tightening bondage to the machine. One such idea was the automatic "spanking machine", able to administer a beating simultaneously to a whole row of culprits, tied to the steam-powered apparatus, side by side, their bottoms exposed![23]

As a controversial social issue, the bonding of the worker to the machine also received scientific attention, leading to theories like the "Science of Work" and "Taylorism".[24] These theories tried to give the issues raised by the widespread use of machines in working life a scientific basis. They concentrated on the worker, whose

---

[21] James Phillips Kay (later Sir James Kay-Shuttleworth): The Moral and Physical Conditions of the Working Classes employed in the Cotton Manufacture in Manchester, 1832, cit. Jennings: Pandemonium, 185.

[22] Adrian Forty: Objects of Desire. Design and Society 1750-1980. London: Thames and Hudson, 1986.

[23] Cartoonists also imagined mechanical "photographer's chairs", that resembled ghastly torturing instruments. The idea of tying the person to be photographed to a mechanical contrivance had a basis in reality. Photographers often used head and neck stands to help people remain motionless when the picture was taken. The idea of "freezing" the subject was taken much further in prison photography. Inmates understood that having a photograph taken would help in their identification and surveillance. They tried to move their heads so that the photographs would be blurred. Special chairs with straps were created to immobilize the prisoner. This naturally also brings to mind the electric chair, invented in the 1880s for permanent "immobilization" of the inmates who had been given a death sentence.

[24] See Anson Rabinbach: The Human Motor. Energy, Fatigue, and the Origins of Modernity, Berkeley and Los Angeles: University of California Press, 1992. About "psychotecnical" research applied to female office workers in Germany, see also Fräulein von Amt, Herausgegeben von Helmut Gold und Annette Koch, Munich: Prestel-Verlag, 1993.

body and its motions were submitted to an intensive analysis. A central aim was to define the optimal body language that would enable the worker to perform with maximum efficiency. Chronophotographic studies, like those by Étienne-Jules Marey and Georges Demenÿ, served a similar function: by freezing the movements of the body, captured in a series of successive photographs, gestures and motions could be submitted to an "objective" scientific analysis.[25] There were deep contradictions underlying these theories. The supporters of the scientific approach claimed that educating the worker to use his/her body "scientifically" according to the defined principles prevented it from becoming exhausted, making the worker's life easier. The critics of mechanization countered by claiming that the proposed methods merely dehumanized the worker, turning him/her into a machine (or a machine part). As Mark Seltzer has shown, the need to adapt to the monotonous rhythms of the machine often led to psychological disorders known as "pathological fatigue" or "the maladies of energy".[26]

From Automata to Automatic Machines

In the second half of the 19th century a line of different machines appeared. In many ways they were the antithesis of the production machines in the factories and offices. The new machines were used voluntarily, outside the working hours. They were placed in all imaginable public places: street corners, bars, newsstands, department stores and hotel lobbies, waiting rooms at railway stations, amusement parks, seaside resorts and trade fairs. Eventually they found their way into "Penny Arcades" designed for the purpose. Particularly from the 1880s on, many different types of machines were developed: vending machines, "trade stimulators", gambling machines, strength testers, fortune-telling machines, electric shock machines, games machines, automated miniature theatres (or "working models"), viewing and listening machines, automatic scales.[27] These devices have come to be known by the generic terms "slot machines", "coin machines" or "coin-operated machines" (coin-op's), referring to their basic principle of operation. Whatever the mode of interaction, the user begins the session by inserting a coin in a slot. The machine gives something in return: a postcard, candy or cigar, a "therapeutic" electric shock, a receipt with one's weight or fortune, a visual or musical performance, an amusing joke, a psychologically or socially encouraging experience, an opportunity to train one's skills, enjoy a sharp-shooting session or -- last but not least -- a possibility to turn one's initial investment into a shower of coins.

---

[25] Marey's and Démeny's work also aimed at creating the perfect soldier: an effective and tireless killing machine. They received ample financing from the French army, who felt the need to improve its performance after being defeated in the Franco-Prussian war of 1870-71. About Marey's work, see Marta Braun: Picturing Time. The Work of Etienne-Jules Marey (1830-1904), Chicago and London: The University of Chicago Press, 1992.

[26] Mark Seltzer: Bodies and Machines, New York and London: Routledge, 1992, 13.

[27] A good way to gain an idea of the freat variety of these machines is to peruse Richard M. Bueschel: Collector's Guide to Vintage Coin Machines. 2nd Edition with Updated Price Guide, Atglen, PA: Schiffer Publishing, 1998 [1995]. The book contains plenty of basic information and hundreds of color photographs. According to Nic Costa, the number of patent applications for coin-operated devices grew from three in 1883 to 139 in 1887, etc.. By the mid 1890s more than 1000 patent applications for such devices had been received by the british Patent Office (Costa, op.cit., 11).

In spite of their variety, on the basis of their mode of "feedback", the slot machines fall broadly into two categories that could be labelled "automatic" and "proto-interactive". These labels are necessarily anacronistic. In the late 19th and early 20th centuries the word "automatic" was often applied to any kind of coin-operated machine. The word obviously emphasized the fashionable novelty of these devices, associating them with technological progress and the march of the machines in society. Evoking the ancient tradition of "automata" (to be discussed later), it also referred to a situation where a human operator had been replaced by a mechanized system; whatever the mode, the communication took place between a human user and a machine as the partner. An arcade advertising "Automatic Amusements" could contain an eclectic array of machines with many different user interfaces and modes of operation, all activated by the visitor him/herself.[28] For an archaeology of gaming, however, the division "automatic" - "proto-interactive" makes sense. It helps us decipher the operational and cultural logic of these machines, and hopefully gives us clues about the cultural modus operanti of their electronic and digital successors.

According to our classification, in the case of an "automatic machine" the user's role is limited to a momentary, simple, non-continuous action: inserting a coin, perhaps pushing a button or pulling a lever, and then maybe opening a box or lifting a cover. Examples of such machines are vending machines, mechanical miniature theatres, fortune-telling machines, music boxes and "automated phonographs", the predecessors of jukeboxes. After initiating the action the user picks up a product or merely experiences the machine in operation. The duration of the experience varies. Picking up a cigar or a chocolate egg from a "coin freed" vending machine only takes an instant, while viewing or listening machines provide the user a somewhat longer scopic or auditive experience. It is important to note that after the initial action, the latter part of the experience is passive. The person enjoying the spectacle does not affect its nature in any way. The presentation has a pre-defined course of action and duration. When it is over, the user can repeat it by inserting another coin, or just walk away.

The "automated" experiences provided by such devices were preceded by those offered by automata, human- or animal-like mechanical marvels that spoke, made music or performed acrobatic stunts. Displayed by touring showmen and dime museums, such devices had astonished audiences for centuries. Beside the technological simulation of life, their fascination must have been based on the distanced position assigned to the viewer. Direct interaction with the automaton was not allowed. The experience was mediated by a human, a showman who introduced, started and interpreted the automaton's performance (and also collected the coins, sometimes aided by his monkey). In a way the performing automaton created around itself a kind of "magic circle" the spectator was not allowed to enter. The classic automaton was also emphatically "useless". It was the opposite of a practical or productive machine, although its mechanism could be highly sophisticated (clockworks, etc.). An automaton performed its stunt to amaze, to raise money for its exhibitor and perhaps advertise the skills of its maker (who often created "useful" things as well, such as clocks, and even mechanical looms). In their spectacular

[28] See Lynn F. Pearson: Amusement Machines, Princes Risborough, Buckinghamshire: Shire Publications, 1992, p.4 (Shire Album 285).

uselessness the automata clearly differed from their successors, the prosaic, but highly performative industrial robots.

The way in which the emerging department stores appropriated the automata tradition in the late 19th century and metamorphosed it into their animated dioramas for the Christmas-time window displays was a sign of the times. The animated diorama was now merely a teaser for the real consumeristic spectacle waiting behind it, inside the building. The window pane separated the spectators from the spectacle. The people standing on the sidewalk in front of the display had no direct control over it. They were supposed to be marvelling on the giant steps taken by commercial capitalism. The proliferation of automated slor machines in the cityscape took place simultaneously with this development. Here a user was given at least an illusion of agency, although within limits that had been strictly predefined (which did not prevent people from treating the machines in subversive ways).[29] The user was at least seemingly allowed to enter the magic circle, negociating the experience oneself by touching the machine physically, and, most importantly, by "penetrating" it by means of the coin. What was the psychological consequence of this action? Did it break the magic circle, or actually enhance it by making the user a participant in its mysteries? It might be proposed that the introduction of coin-ops was merely an alternative strategy adopted by commercial capitalism. Instead of marvelling an "untouchable" spectacle in the department store window, the proliferation of coin-operated "automatons" gave the hard-pressed consumers a temporary, and largely illusionary, feeling of being in command.[30]

Some automatic coin-op devices made efforts to re-create the "magic circle" of the display of automata by re-locating it inside the device, often behind a display window. This is most evident in the case of the fortune-telling machines that contained life-sized animated figures enclosed in a glass case - these simulated forture-tellers, "Princess Doraldinas" or "Zoltans", were essentially automata displayed in a new context.[31] Although coin-operated, their fascination was based on their "mysterious" agency and "independence". The case of the Automatic Phonograph is more complex. The phonograph, the first successful device for both recording and playing back speech and music, was invented by Thomas Edison in 1877, and put into the market in an improved version a decade later.[32] It became a great success as a stand-alone coin-operated version, often exhibited in public "Phonograph Parlors" (a predecessor of the game arcade). It was enclosed in a wooden cabinet with the phonograph mechanism -- an attraction in its own right --visible behind a glass cover. After inserting a coin the listeners were connected with the device for a short time wearing

---

[29] The history of subversive treatment of coin-op machines is as long as that of the machines themselves. Using fake coins is the most well known trick, but there were many others, all the way to the well-known tilting of the pinball cabinet for enhanced performance. See Costa, op.cit., P.19.

[30] The word "automaton" was used about coin-op machines. In 1895 De Natuur wrote: "At the present time we are being inundated with automatons. If this continues, the time will come when all the arts and crafts will be performed by machines which, at the cost of a coin, be it large or small, will be at everybody's service." (cit. Costa, op.cit., p.16). Because of widespread mistreatment, most automatic machines only dispensed cheap items or gave small rewards.

[31] Another inheritor of the automata tradition, also placed behind a sheet of glass are the animated dioramas shown by many department stores in their show windows around Christmas.

[32] For a general history, see Paul Charbon: Le phonographe à la Belle Epoque, Brussels: S.P.R.L. Sodim, 1977. On the background of the phonograph, see Lisa Gitelman: Scripts, Grooves, and Writing Machines. Representing Technology in the Edison Era, Stanford: Stanford University Press, 1999.

earphones and often leaning against the cabinet. Although this kind of contact may now seem insignificant, it anticipated later ways of spending time linked physically to a machine for the purpose of pleasure. With sounds from the earphones filling his/her head, the listener had entered a new virtual realm, another kind of magic circle. The experience could be lengthened by moving from machine to machine, with enough coins in one's pocket.

Proto-Interactive Machines

In the case of the "proto-interactive" machines the human-machine relationship went further. Their operating principles were based on the user's repeated and continuous action to which the machine "responded" in various ways. The tactility of the relationship was essential: to activate the machine one had to touch it by means of an "interface". The gambling machines (later known as "one-armed bandits") were the simplest. Their operation was limited to inserting a coin and pulling a lever which made a set of "reels" (usually three) with graphic symbols spin inside the machine. The outcome of the game depended on the final combination of the symbols.[33] The operation was made very "user-friendly" to encourage repeated use. Gambling machines were meant to have a mesmerizing effect on the user, creating yet another kind of magic circle, an intensive feedback loop connecting the player and the device. Mechanical repetition was to induce psychological repetition, which at times manifested itself as compulsive behaviour. The goal was to make the user spend more and more coins at an increasing pace. The effectiveness of this formula is proven by the fact that it still is the basis of millions of slot machines in casinos around the world.

Gambling machines gave minimal opportunities for higher level interaction - the outcome of the game depended on chance, rather than on the quality of the player's actions. Using such machines was not far from the repetitive gestures the worker was forced to perform in a mechanized factory. One might question whether such machines deserve to be called proto-interactive at all; the user was, after all, merely the initiator of the process (and perhaps, in the end, the recipient of a reward). The interactive quality of stereoscopic viewing machines, such as the popular Whiting's Sculptoscope, did not get much further. After inserting a coin the user peeked into an eyepiece and released a series of 3D cards one by one by pushing a button or pulling a lever. It was only possible to effect the duration of the viewing act, to choose for how long one wanted to stare at an individual card before introducing another. Another device, the Mutoscope, provided slightly more opportunities. First introduced in 1897, it was a novelty peep show box for viewing "animated photographs".[34] Different from its motor-driven predecessor, Edison's Kinetoscope, the Mutoscope was hand-

---

[33] The ultimate source of information on gambling machines is Marshall Fey: Slot Machines. A Pictorial History of the First 100 Years, Fifth Edition, Reno, Nevada: Liberty Belle Books, 1997 [1983]. The author's grandfather was the famous slot machine manufacturer and inventor Charles Fey, the creator of the original Liberty Bell (1899), the model for countless slot machines up to the present.

[34] On the invention of the Mutoscope, see Gordon Hendricks: Beginnings of the Biograph, New York: The Beginnings of the American Film, 1964, pp.59-65. For its early history, see Bueschel & Gronowski: Arcade 1, op.cit., pp. 91-100.

cranked.[35] The frames of the moving pictures had been copies on paper slips attached to a rotating cylinder. The cranking speed could be freely adjusted, and the session interrupted at any point to observe a particularly interesting frame (perhaps a half-naked lady). The only limitation was that the movement could not be reversed. Of course, this was an economic rather than a technical imperative. For just one coin, the user could not be allowed to spend too much time with the device; the profit had to be maximized.

The proto-interactive nature of the Mutoscope was clearly expressed in an advertising booklet in 1897:

"In the operation of the Mutoscope, the spectator has the performance entirely under his [sic] own control by the turning of the crank. He [sic] may make the operation as quick or as slow as fancy dictates...and if he [sic] so elects, the entertainment can be stopped by him [sic] at any point in the series and each separate picture inspected at leisure; thus every step, motion, act or expression can be analyzed, presenting effects at once instructive, interesting, attractive, amusing and startling."[36]

The expression "entirely under control" almost sounds like a flash-forward, an echo of the advertising slogans around interactive media. There was, however, an important difference: experiencing the voyeuristic offerings of the Mutoscope required no acquired mastery, a central quality of videogames.[37] To view a Mutoscope reel one needed no more skill than for performing the simplified operations by the assembly line in a mechanized factory. Using a telephone switchboard or a typewriter was much more requiring. Strength testers and mechanical game machines took a step, although timid, towards incorporating mastery. Machines belonging to the first type only required physical strength to punch a boxing bag, to hold handles as an electric stream ran through your body or to have an arm-wrestling match with Apollo or Uncle Sam. The anthropomorphic interfaces may in retrospect have been their most remarkable feature. Most of these machines involved the use of hands, thus antipating their growing importance on the field of interactive entertainments. The outline of the hand(s) was often painted or imprinted on the machine's interface, making the tactile connection visually explicit. Yet, anticipating the popular arcade game Dance Dance Revotion or DDR (Taito), there were also machines operated by one's feet. To excel in a more unexpected variant, the "Lion Head Lung Tester" (Mills, 1904), one needed to blow hard in a pneumatic tube to make a mechanical lion roar

---

[35] This decision may be partly explained as an effort to avoid patent infringement. The Kinetoscope and the Mutoscope were largely the work of one man, William Kennedy Laurie Dickson, who left Edison's company after the development of the Kinetoscope. Edison tried find new applications for his electric technology, which may explain why the Kinetoscope used an electric motor to run the film. Mutoscope relied on a different principle, that of the flip book, which had been known since the 1860s. But Mutoscope was also more reliable and could be shown in places where electricity was not available. Kinetoscope soon disappeared from the market, while the Mutoscope became a great success that lasted until 1950s, and even later.

[36] Cit. David Nasaw: Going Out. The Rise and Fall of Public Amusements, Cambridge, Mass.: Harvard University Press, 1999 [1993], 133.

[37] About the notion of mastery in videogames and interactive media, see Grahame Weinbren: "Mastery (Sonic C'est Moi)", op.cit.

and flicker its eyes. This alternative has not been explored by arcade videogame makers, and probably never will.[38]

With mechanical sporting games, displays of skill began to replace the need for raw physical power. From the late 19th century on many different types came to the market, pointing towards the immeterialization of the gaming experience. Among the most successful genres were the shooting games (hunting, target shooting). They were sometimes justified by patriotic slogans, such as Lord Salisbury's dictum "Every man should learn to shoot!"[39] Coin-operated shooting games were an individualized and mechanized form of the shooting galleries, which were popular attractions at fairgrounds and fairs. For any moralist deploring the devastating effect of Doom or Quake on today's youth, this background should give something to think about. There were many machines that simulated sports, such as boxing, bowling, football and horse racing. The player either participated in the sport simulation as him/herself or transferred his/her actions to miniature players (kind of "proto-avatars") operating within the realm of the game. By being mutated to this new mechanical "arena" the actual sport genres were transformed. Many early games were for a single player, but multi-player possibilities increased stedily. Although the interactive possibilities offered by these machines were limited, the ways in which they managed to create desire, pleasure and involvement anticipated the intense user-relationships created by arcade videogames. In this sense none was more successful than Pinball, a mechanized version of the Victorian parlor game bagatelle.[40] Introduced in the 1930s, its golden age dawned after World War II, helped both by new, more interactive features (the "flippers") and the emergence of the postwar youth culture.

The Social Contexts of the "Counter-Machine"

David Nasaw has characterized the meaning of early slot machines by saying: "Here was the perfect diversion for city folk, a momentary break from routine that was so unobtrusive it could be seamlessly interwoven into the fabric of daily life."[41] The same people who spent their days "chained" to the machines in factories and offices could gather around these different machines during their lunch breaks or in the evenings and during the weekends. They provided an escape which did not take the users too far from their duties in daily life. The experience provided by these machines was short, fleeting, ephemeral. Their colorful appearance, their fantastic forms and the very fact that they were a new brand of the Machine, the guiding idea of the era, increased their appeal.The sosiologist Yves Hersant has analyzed the nature of these new machines by contrasting them with the world of work:

"They are all based on the negation of work, and it is particularly ironic that in its social context the slot-machine has reversed its capitalistic and industrial role, thereby consuming rather than producing wealth. It is clear that such a paradoxical

---

[38] Bueschel: Coin Machines, 119. With 21th century hygienic standards the popularity of pneumatic blowing machines in the late 19th and early 20th century seems almost surreal.
[39] Costa, op.cit., p.21.
[40] About the history of Pinball, see Michael Colmer: Pinball. An Illustrated History, London: Pierrot Publishing, 1976.
[41] David Nasaw: Going Out. The Rise and Fall of Public Amusements, 159.

instrument could be found only in a mechanically-orientated world, both as a by-product and a counter product of mechanics."[42]

Slot machines obviously fulfilled a therapeutic function by providing the user an opportunity to step outside the capitalistic idea of constant productivity and scientifically regulated work routines for a moment. The user could release one's tensions by beating a mechanical strongman in arm-wrestling, shooting herds of mechanical animals or merely immersing oneself into the erotic fantasies of the Mutoscope. He (and more rarely she) could look for social esteem denied in the rigid hierarchy of the workplace. For the growing crowd of office workers, machines like strength testers, could actually perform a paradoxical return to the world of physical toiling of which they had been increasingly alienated in the modern office. Yet in spite of their therapeutic value, it would be naive to assume that slot machines had been able to achieve a true "liberation", even a momentary one. It is more likely that the "negation of work" that began when a user put his/her coin into one of these machines, initiated a psycho-technical feedback loop that linked the working life and the spare time even more tightly together. The slot machines may have been "counter machines", but they were machines nevertheless, and functioned according to machine logic.

Analyzing discourses of bodies and machines in the late 19th and early 20th century literature Mark Seltzer has paid attention to a peculiar psychic disorder that manifested itself as machine induced neurastenia. As defined by Anson Rabinbach, neurastenia means "an ethic of resistance to work or activity in all its forms."[43] Much researched in the late 19th and 20th century, it was identified as symptom of the fatique caused by monotonous and repetitive work routines in mechanized factories. It would be tempting to associate the great success of proto-interactive coin operated machines with this same phenomenon. The over-stimulated mind of a neurastenic is unable relax, except by being drawn to another kind of a machine. With machines and "counter-machines" filling one's life, there is no way to break out of the circle. Whether such a comparison makes sense or not, it is tempting to look for a modern example of a similar phenomenon from Japan, where millions of "salariman" (white collar workers) spends their evenings, and often even their lunch hours, in one the countless game centers, driving simulated cars or trains, or staring at the screen of a Pachinko machine, with its endlessly bouncing balls. In a collective society with strict work morale interfacing with game machines has become simultaneously an obsession and an outlet.

Although they may not have been a remedy to the psycho-physiological problems caused by machine culture, the slot machines also had a social dimension. Just like the amusement parks that became popular in the late 19th century, slot machines provided opportunities for new forms of social interaction between the sexes. They were a common topic for discussion, and also an opportunity to make an impression on others, to try to improve one's self-esteem.[44] The social values activated by the

---

[42] Yves Hersant: "Introduction", Jean-Claude Baudot: ARCADIA. Slot Machines of Europe and America, Tunbridge Wells Kent: Costello, 1988 [1983], 9.
[43] Rabinbach, The Human Motor, op.cit.
[44] This strangely resembles the peculiar Gym Culture in today's Southern California. Gym card holders certainly excercise with all kinds of machines, but this act seves all kinds of symbolic goals, some of

slot machines were, in spite of the "modernity" of the phenomenon, mostly conservative. Devices like gambling machines and strength testers did little to challenge the prevailing gender divisions. They belonged to the male territory. Gambling machines, located in bars, were rarely even seen by "decent" women. When it comes to the strength testers, women were usually assigned a passive role as observers, while the men punched the bag or swang the hammer. Mutoscope is an another device that has been associated with the male user, mainly because of the erotic and voyeuristic content of many reels. Yet masculinity may also have been inscribed into the design of the machine. Linda Williams has noted the relationship between the physical turning of the crank of the Mutoscope (located on the frontside) and the action of male masturbation.[45] Partly because of its doubtful reputation, often commented on by satirical cartoonists, the Mutoscope has been left outside "serious" histories of the moving image, in spite of its phenomenal success and long-lasting cultural presence. If mentioned at all, it is presented as an early effort, a false path that was soon superceded by the mainstream of projected moving pictures. Until the end, Mutoscopes showed short clips, while the "real" film culture was associeted with the feature film.

It could be claimed, however, that the world of slot machines may have been more heterogeneous than has been thoughts. Some studies about women's spare-time activities around the turn of the century imply that the situation was not necessarily so clear-cut. Feminist scholars like Kathy Peiss and Lauren Rabinovitz have challenged earlier ideas about women's passive and distanced relationship to public amusements.[46] Particularly young working women (shop assistants, office ladies, factory workers) were looking for amusements from community halls, amusement parks, nickelodeons or just city streets. They were searching for outlets from their somber living conditions and actively locating partners, thus subverting moral rules of the late Victorian era. The world of bars and saloons -- the havens of gambling machines -- were largely closed from women who were concerned about their reputation, but the sprawling urban environment must have offered women many opportunities to interact with coin-ops and other entertainment machines. One should not neglect the fact that women who had entered the working life as typists and telephone operators were often in more direct contact with the latest technology than males. Although, as Ellen Lupton has shown, they were relegated to the role of mediator and thus segregated from power and decision making, they would have been at ease with new machines, including "coin-op's".[47]

Although there is at present little direct evidence about women's contact with slot machines, after reading Peiss's and Rabinowitz's studies it makes sense to assume that women used Mutoscopes and other coin-ops much more often than has been

---

them conscious, some not. Gyms are places to display one's body, to socialize, and to create business relationships.

[45] Linda Williams: "Corporealized Observers. Visual Pornographies and the 'Carnal Density of Vision'", in Fugitive Images. From Photography to Video, edited by Patrice Petro, Bloomington and Indianapolis: Indiana University Press, 1995, p. 19.

[46] Kathy Peiss: Cheap Amusements. Working Women and Leisure in Turn-of-theCentury New York, Philadelphia: Temple University Press, 1985; Lauren Rabinowitz: For the Love of Pleasure. Women, Movies and Culture in Turn-of-the-Century Chicago, New Brunswick, New Jersey: Rutgers University Press, 1998.

[47] Ellen Lupton: Mechanical Brides. Women and Machines from Home to Office, New York: Princeton Architectural Press, 1993.

assumed.[48] Some known photographs of women eagerly interacting with Mutoscopes point to this direction, although they fail to provide conclusive evidence.[49] The fascination exerted by slot machines could perhaps be compared to the pleasures provided by amusement park rides.[50] Yet the constitution of the subject position of these devices was quite different. While slot machines required some form of conscious physical activity from the user, in the amusement park rides "[t]he person surrendered to the machine which, in turn, liberated the body in some fashion from its normal limitations of placement and movement in daily life".[51] How did the forms of pleasure provided by these attractions differ from each other? Were the pleasures of "proto-interactivity" really very different from those provided by the "passive" sensations of the roller-coaster? These questions are important because they have been activated again in the context of interactive media, claimed to be categorically different from "passive" spectacles like going to the movies or watching television.[52]

A group that was largely excluded from using early coin-ops, with perhaps the exception of simple vending machines on the streets, were children. This exclusion was inscribed into the user interfaces of many machines. Many strength testers required too much physical power to be usable by chidren. Kinetoscopes, Mutoscopes and other peepshow machines had their viewing hoods or control interfaces so high from the ground that a child would not have been able to reach them.[53] It is likely that many children became acquainted with these machines with the help of their parents, lifting them up towards the viewing hoods and control devices. Because of the bad reputation of amusement arcades, this experience often took place in family oriented amusement parks and fairgrounds, where proto-interactive devices where placed alongside other kinds of attractions, merry-go-rounds, roller coasters, ferris wheels and traditional shooting and gaming galleries. The co-presence of these different types of attractions created an integrated experience, where submission and immersion took turns with active participation. During the 20th century the number of coin-operated devices that were either meant for children or could be operated by them because of their interface design steadily increased. This seems to have reflected social changes, such as the loosening of the family control on children's pastime, the increasing amount of pocket money at their disposal, and growing importance of human-machine interaction in daily life. More research on this topic would be needed.

---

[48] At the Musée Mechanique in San Francisco's Cliff House there is a slot machine that must have appealed to working women. It is the automated typewriter that functions as a fortune-telling machine. It is easy to imagine an office lady, "chained" to her typewriter all day long, pushing her coin into the slot of this machine. She does have to do anything else - the typewriter types automatically for her.

[49] A great example, captioned "'Living Pictures' on the pier, 1912" shows a row of four Mutoscopes outside on the pier, with two women peering into the machines. No men are seen in the picture. Brian Coe and Paul Gates: The Snapshot Photograph. The rise of popular Photography 1888-1939, London: Ash & Grant, 1977, 90.

[50] King Vidor's classic silent film The Crowd (1929) provides a vivid picture of the willingness of the working women to immerse themselves into the new mechanized amusements.

[51] Rabinowitz: For the Love of Pleasure, 143.

[52] About theme park rides, see my "Encapsulated Bodies in Motion. Simulators and the Quest for Total Immersion", in *Critical Issues in Electronic Media,* edited by Simon Penny, Albany: State University of New York Press, 1995, 159-186.

[53] The International Mutoscope Reel Company began at some point, probably in the 1920s or later, manufacture special "kiddie stands" that would enable a child to use the machine. Such stands were special accessories. Still, their existence shows that the company began to acknowledge the importance of children as potential users.

From the Penny Arcade to the Game Center

Early slot machines were placed in many kinds of public places, both indoors and outdoors. Like wall-mounted broadsides, billboards and posters, they became one of the tokens of an urban landscape in transition. The novelty value of the coin-ops, which was reflected in many early cartoons poking fun at the devices as well as their users, gradually faded.[54] Although many machines were silently removed, others became a permanent feature of the modern city. They were so common and familiar that the city dwellers' relationships to them became "automated". To use one one hardly needed to think about the whole operation. Although ever-present, the machines became invisible, like the ATM's today. This is probably also one reason for their nearly total absense from the cultural histories of the 20th century.

While the coin-ops were scattered in the cityscape they were also concentrated in "penny arcades". Beginning from the 1890, such arcades were found in many cities, but also at amusement parks, "midways" (the entertainment areas of public expositions) and seaside resorts. Alhtough some arcades were touring attractions, connected to a railway show or a touring circus, many of them were located in storefronts, converted to accomodate the new "automatic amusements".Many of these were modest, operating mainly during the winter season and housing the repertories of touring showmen.[55] Yet there were also arcades that were permanently installed in their premises. They presented themselves as a new kind of entertainment that tried to attract a general "respectable" audience. David Nasaw has listed the offerings of an exceptionally luxurious early arcade, the "Automatic One Cent Vaudeville" emporium in New York City.[56] Most early penny arcades would have contained similar items, although in smaller quantities and in less grandiose settings:

"Inside, the long narrow arcade extended a block south to the 13th Street. It was lit with chandeliers and hundreds of large white-frosted bulbs; the floor jammed with the latest and most luxurious collection of automatic coin-in-the-slot machines available anywhere. For the sporting crowd, there were punching bags to compare your punch with Corbett's, Jeffries', Fitzsimmons', or Terry McGovern's; shooting-gallery rifles; weights to pull; hammers to pound; stationary bicycles and hobby-horses. There were also automatic amusement machines that dispensed cards with your fortune, your horoscope, or your future wife's picture; metal embossers that spit out 'Your name in Aluminum'; 'automatic' gum, candy, and peanut machines; coin-in-the-slot phonographs with the Floradora Sextet, Sousa's Band, and comic monologues; and more than 100 peep-show machines."[57]

---

[54] In cartoons, the coin-ops seemed capable of performing any imaginable tasks. Graphic artists and humorists imagined "automatic dentists", "automatic conscience clearers", "automatic arbitration", "automatic warm water washstands", etc. They also showed people trying these machines, and being ridiculed by the crowd orserving the operation. For examples, see Costa, op.cit., p.14, 10.

[55] Some penny arcades operated in the cities during the winter season, but were taken again on tour in the spring. They were hybrids of a stationary and hybrid attraction.

[56] The "Automatic One Cent Vaudeville" was the enterprise of Adolph Zukor (the later CEO of Paramount Pictures) and Morris Kohn. See Nasaw: Going Out, 157.

[57] Nasaw: Going Out, 157.

On offer here was a true multimedia, multi-interface and multisensory experience, made even more attractive by the fact the the presence of media technology in the home was still very limited. Such arcades were, however, not an absolute novelty. The consept "penny arcade" evokes the popular 19th century shopping arcades (or "passages"), considered by Walter Benjamin as one of the earliest signs of urban modernism.[58] From the first half of the 19th century such arcades had contained, beside shops and boutiques, also novelty amusements, like dioramas and cosmoramas. For shoppers, such attractions were just another kind of commodity, an experience to buy.[59] Some shows even adapted the idea of the arcade to their own purposes. Cosmoramas, for example, were peep show "arcades", consisting of rows of magnifying lenses inserted into the walls. Illuminated views, often with sensational subject matter, were peeped at through the lenses. The popularity of cosmoramas -- also B.T. Barnum's mighty American Museum had one -- inspired all kinds of improved spectacles.[60] One of them was the Kaiser Panorama, a European wide network of stereoscopic peepshow arcades that operated for several decades from the 1880s on.[61] Although the idea of gathering Edison's Automatic Phonographs and Kinetoscopes into public phonograph and kinetoscope "parlors" has often been treated as a cultural innovation, it was just an adaptation of an existing tradition.[62] The novelty was in turning this tradition "automatic", in other words: coin-operated. The cosmoramas and other early arcade amusements had usually been non-interactive. The images were for viewing only, and a fee was collected at the entrance.

In spite of their huge and immediate popular appeal, penny arcades were often soon considered morally questionable. They were accused of being breeding-grounds for vice and even for infectious diseases. Penny arcades attracted a socially mixed crowd, including women. They were seen as dark and gloomy. The attitudes towards them had much in common with those associated with the earliest cinemas, known as *nickelodeons*.[63] Like the penny arcades, many nickelodeons also operated in converted store fronts. Sometimes both were combined: cinemas were opened in the back rooms of the penny arcades (the association between "pennies" and "nickels" is not a coincidence). To enter the room, the spectators would have to walk through the penny arcade itself, filled with proto-interactive machines, above all Mutoscopes. The

---

[58] Walter Benjamin: Charles Baudelaire. A Lyric Poet In The Era Of High Capitalism, Translated by Harry Cohn, London: Verso, 1983.

[59] The same arcades often contained showrooms for printers and toysellers, who specialized in optical toys, an important predecessor to moving images and also electronic games.

[60] The first Cosmorama is said to have been opened by by the abbott Cazzara in Paris in 1808. See Donata Pesenti Campagnoni: Verso il cinema. Macchine spettacoli e mirabili viosioni, Torino: UTET Libreria, 1995, 87.

[61] The Kaiser Panorama (later known also by other names) was the invention of the German August Fuhrmann (1844-1925). It was based on earlier stereoscopic viewing arcades. The pre-history of the gaming arcade is very rich and complex. It cannot be fully detailed here.

[62] The first phonograph parlor was opened by The Ohio Phonograph Company in Cleveland on September 15, 1890. The listening machines were often lined along the walls of the premise, re-enacting the arrangement of the Cosmorama (also known as "Cosmorama Rooms"). Peeping at images was replaced by the listening of sounds. The intimacy of the peephole was replaced by the aural intimacy provided by the earphones. See Charles Musser with Carol Nelson: High-Class Moving Pictures. Lyman H. Howe and the Forgotten Era of Traveling Exhibition, 1880-1920, Princeton: Princeton University Press, 1991, 38-39.

[63] For original documents related to this debate in the early 20th century, see Colin Harding and Simon Popple: In the Kingdom of Shadows. A Companion to Early Cinema, London: Cygnus Arts & Fairleigh Dickinson University Press, 1996, 68-71. Several documents attack "mutoscopic" outrages, although defemces are also included.

arcade would function as a waiting room (a kind "pre-show") for the cinema experience, thus re-enacting an already old tradition.[64] From a theoretical point-of-view, a tension was created between these two modes of consuming moving images - the hand cranked peep shows and the screen projection. These two forms soon went to different directions, although some slot machines remained in the lobbies of cinema theatres. The co-existence of game centers and cinema multiplexes in shopping malls has brought them together again.

Although t is commonly agreed that both early penny arcades and nickelodeons attracted a mixed audience, its exact constitution is still open to debate. Most probably there were audiences than an audience. A particularly enthusiastic users for the penny arcades were certainly adolescent boys (when they managed to sneek in). Popular illustrations, including cartoons and postcards, often show delighted youngsters peering into the Mutoscope.[65] According to a contemporary observer a sign displayed in Samuel Swartz's arcade in Chicago, "For Men Only", "attracts the small boy like a magnet".[66] This was often considered a social problem, for which solutions were sought. Tinkering with wireless transmitters and radio sets was promoted as a good domestic hobby for boys at least partly to keep them away from the streets . Also for women penny arcades were consided unsuitable, although signs saying "For Women Only" were sometimes displayed next to some attractions (no doubt to stir the curiosity of men as well). As Kathy Peiss and Lauren Rabinowitz have demonstrated, young working women often disregarded reproaches and entered "forbidden" places. Considering penny arcades as a zone for men only seems a false generalization that fails to account for the variety of their audiences and attractions.

With the advent of the "movie palace" era in the 1910s, the cinemas managed to whitewash their public image. In spite of the fashionable "high class" penny arcades, their general reputation got even worse in the eyes of moral reformers and authorities. During the Great Depression of the 1930s, often considered the golden age of the penny arcade in the United States, these places provided unemplyed men affordable opportunities to spend time. Interacting with an arcade game or trying one's luck with a gambling machine, often disguised as an "innocent" machine, such as a candy or cigarette dispenser, made one forget the harsh realities for a while. A common objection against slot machines was their association with gambling and organized criminality. The authorities often adopted tough measures, forbidding slot machines and instituting laws against gambling. As Marshall Fey's history of the slot machine demonstrates, the trajectory of the fight against these machines is equally long as their history itself. Its symbolic manifestation were the wrecking parties

---

[64] This arrangement can already be found from Etienne-Gaspard Robertson's Fantasmagorie-show in Paris in the 1790's. Fantasmagorie, or Phantasmagoria was a form of magic lantern show. Before entering the hall itself, the audience often spent time in an "antechamber" looking at mechanical curiosities and perhaps observing a popular scientific demonstration. This tradition continues in the "pre-shows" of many theme park rides today. For Robertson, see Francoise Levie: Etienne-Gaspard Robertson. La vie d'un fantasmagore, Bruxelles: Les Editions du Préambule et Sofidoc, 1990.

[65] However, there is only one example of this in Stephen Bottomore's I Want to See This Annie Mattygraph. A Cartoon History of the Movies, Pordenone: Le giornate del cinema muto, 1995 (page 171). There are several cartoons showing middle-aged men peering into the Mutoscope (see pages 40-43).

[66] Nasaw 1999, 154.

organized by the authorities as public stunts for the media.[67] Perhaps the most famous episode took place in 1934. New York City's mayor Fiorello La Guardia himself posed for the press holding a hammer with a large pile of wrecked machines.[68] Similar gestures had often been seen in propagandistic photographs from the Prohibition Era in the 1920s, only now slot machines had taken the place of the barrels and bottles of illegal alcohol. One might also recall the book burning rituals organized by the Nazis, another attempt to "purify" the society. When the Philippines' president Ferdinand Marcos forbid arcade videogames in 1981 and publicly destroyed them with his hammer, he actually re-enacted a well-established cultural model.[69]

The slot machine industry defended itself by changing its focus from games of chance to games of skill. Instead of money, the successful player would be rewarded by "immaterial" values like additional games or high scores displayed in the arcades. Pinball played a crucial role in this transformation. Although it was based on the 19th century bagatelle and existed already in the 1930s, its heyday began in the late 1940s. In 1947 an engineer named Harry Mabs, working for Gottlieb, invented "flipper bumpers", little paddles used to sling the ball back to the gamefield.[70] Flippers were first used in a pinball machine named Humpty Dumpty, which became a model for countless later models. In this improved form Pinball became one of the symbols of postwar youth culture. Pinballs were found in bars or revamped game arcades, the inheritors of penny arcades. The typical.players were now younger than earlier, males in their teens and twenties (sometimes in the company of their girlfriends, who were occasionally allowed to play)..

Arcades, with Pinball as their centerpiece, became part of a lifestyle that encouraged bonding among the youth and served as a safety zone against the repressive values of both the family and the workplace. Playing became a way of being in two places at the same time (bilocation): entering into an intense relationship with an enclosed microworld and remaining at the same time part of a group of peers in the surrounding physical space. Pinball provided an opportunity to show one's mastery for oneself and others and to attain fame and acceptance within the gaming subculture. This situation was symbolically embodied in Tommy, the protagonist of The Who's rock opera (1968), later a successful musical. Tommy is a new kind of (anti)hero, a neglected, mistreated and autistic youth, a "deaf, dumb and blind kid", whose creativity and communicativeness are expressed through a single channel: his phenomenal ability to play pinball. "Standing like a statue", he becomes "part of the machine", according to the lyrics of The Pinball Wizard.[71] Similar figures have since appeared in the discourses around arcade videogames, including films like Nick Castle's The Last Starfighter (1984), a story about a small town boy, whose one special skill, his mastery in arcade games, leads him to become an intergalactic warrior. The

---

[67] A case in point, in France all slot machines (appareil à sous) were forbidden in 1937. According to Jean-Claude Baudot, they were still forbidden in the 1980s, although in less extreme form. There were ways to by-pass the laws. See Baudot: ARCADIA, op.cit., 19.

[68] See Fey: Slot Machines, 111, 137. Slot machines were forbidden in New York City from 1934 until May 1976. See Michael Colmer: Pinball. An Illustrated History, London: Pierrot Publishing, 1976, 37.

[69] Alain et Frédéric Le Diberder: L'univers des jeux vidéo, Paris: La Découverte, 1998, 8.

[70] See Bill Kurtz: Slot Machines and Coin-Op Games, London: The Apple Press, 1991, 56.

[71] "He stands like a statue / Becomes part of the machine / Feeling all the bumpers / Always playing clean / He plays by intuition / The digit counters fall / That deaf, dumb and blind kid / Sure plays a mean pinball" (Words: Elton John, music: Pete Townshend)

emergence of such "topoi" seems to indicate that continuities between pre-digital and digital gaming cultures may be more important than discontinuities.

Video game arcades were direct descendants of the game parlors. The transition that took place during the 1970s was gradual. Mechanical and digital game machines often existed side by side, as photographs from the era demonstrate. There existed a continuity rather than a rupture between electro-mechanical slot machines and video game machines. Not only were the physical interfaces, like the joysticks, simulated guns, steering wheels, etc. often used in earlier games; many game genres, such as driving simulators, shooting games and sport and fighting games, already existed in pre-digital arcades. This connection has been symbolically expressed in a story about Steve "Slug" Russell, one of the creators of *Spacewar*. Russell is said to have exclaimed, many years after working on the game, as if struck by a sudden revelation: "*By gosh – it* is *a pinball machine!*"[72] As can be expected, video game arcades inherited their predecessors' bad reputation. Loud criticism was heard from parents' groups and authorities concerned with the sanity and moral of the youth. The widely publicized prejudices against arcade videogames and the arcades themselves was probably one of the reasons for the breakthrough of home gaming: parents bought videogame consoles for their children to keep them away from those diabolic places. In the early 1980s game centers launched campaigns to clean their image. Yet the efforts to turn the arcade experience into a form of family entertainment did not please the hardcore gamers who had grown up in the "seedy caves" (J.C.Herz). According to Herz, after the "destruction" of video game arcades, their real continuity can be found from the realms of networked role-playing games on the Internet, at least when it comes to the sense of community and atmosphere.[73]

Conclusion: Beyond Cryptohistory

Slot machines have been nearly totally neglected by cultural historians and media scholars.[74] Even historians of popular culture usually mention them only in passing, without analyzing them, or re-placing them into their original cultural contexts. The existing literature has been written almost exclusively by collectors and coin-op enthusiasts. The current state of things does not do justice to the long-lasting popularity and wide cultural impact of these machines. One reason for the *damnatio memoriae* is no doubt their near-ubiquity. When a phenomenon becomes too familiar and commonplace it in a way turns invisible; we no longer pay attention to it. As "counter-machines" opposed to work, productivity and progress slot machines have been considered trivial, an ephemeral form of spending (or wasting) one's time and money. The damnatio goes even further: not only have coin-ops been seen as trivial, they have been considered harmful as well, worth prosecution rather than praise. Of

---

[72] Stephen Levy: Hackers. Heroes of the Computer Revolution, New York: Dell Publishing, 1984, 65. For Stewart Brand Russell told that his main source of inspiration was the series of science fiction books called the Lensman by 'Doc' Smith. See Stewart Brand: II Cybernetic Frontiers, New York: Random House, 1974, 55.

[73] J.C. Herz: Joystick Nation, Boston: Little, Brown and Company, 1997, 58-59.

[74] Unfortunately, much of the evidence about the slot machine users' attitudes has disappeared without a trace, not being considered worth recording. We know the machines and the companies quite well, but not what people thought about them.

course, none of this provides an excuse for neglecting them, for slot machines are, to borrow an expression from Siegfried Giedion, an essential part of the "anonymous history" of our time.[75] They have been a veritable laboratory for designing and testing forms of human-machine relationship. Perhaps it is only with the emergence of interactive media as a major cultural and economic force that their significance gradually becomes clear.

I have tried to show that excavating the past makes sense when trying to explain phenomena like arcade video gaming with seemingly very short histories. Such an approach helps counter the claims frequently made by industry publicists and corporate "cryptohistorians", who like to represent electronic gaming as something unprecedented, a unique phenomenon heralding an imminent transition into a culture of interactivity.[76] Of course, such claims are not totally unfounded. There is much unique, and perhaps even revolutionary, in the games themselves and in their nearly worldwide appeal. It also has to be admitted that we are probably witnessing only the first stages in a development that will attain much more massive dimensions and proceed into directions we cannot at present conceive. Gaming in public spaces like game centers will be only one aspect of the game culture, alongside the use of domestic devices, mobile personal gaming platforms and networking. This article has been deliberately limited to an "archaeology of the arcade", trying to identify its outlines and the forms of human-machine relationships associated with slot machines. Without pretending that arcade videogames and game arcades themselves could be entirely accounted for by reference to the past, it should be clear that many of their incredients are found, albeit in rudimentary form, already in 19th century developments.

The missing thread that should be woven into this narrative is, of course, the archaeology of games played at home and in various intermediate spaces with personal games machines. Isn't this something unprecedented? Once again, there is a history of proto-interactive devices for domestic use, covering a great number of 19th century "philosophical toys", like the phenakistiscope and the zoetrope, early media machines like the phonograph and an even greater variety of miniature theatres and other role-playing environments. Nor should one neglect wireless transmitters/receivers and radio kits that were widely available since the early 20th century. These devices were not used for gaming, but they provided boys with an opportunity for personal tinkering with technology.[77] Such activities anticipated coding and hacking - important aspects of the video and computer game culture from the outset. The history of commercial media also knows attempts to turn existing mass media channels into (pseudo)interactive experiences, including the 1950s children's television program Winky Dink and You. As these examples show, electronic gaming cannot be traced back to any single source. It emerges from a slowly evolving, complex web of manifold cultural threads and nodes. What is clear is that this web began to develop a long time before anything like "digital interactive media" existed.

---

[75] Giedion, op.cit.
[76] About the notion of cryptohistory as applied to media production, see Michael Brian Schiffer: The Portable Radio in American Life, Tucson & London: The University of Arizona Press, 1991, pp.1-2.
[77] See Susan J. Douglas: "Audio Outlaws: Radio and Phonograph Enthusiasts", inPossible Dreams. Enthusism for Technology in America, edited by John L. Wright, Dearborn, Michigan: Henry Ford Museum & Greenfield Village, 1992, pp. 44-59.