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> I recently learned something quite interesting about video games. Many young people have developed incredible hand, eye, and brain coordination in playing these games. The air force believes these kids will be our outstanding pilots should they fly our jets. (Ronald Reagan, August 8, 1983)

With his eyesight failing, Friedrich Nietzsche began to explore the use of typewriters in the early 1880s as a means to continue his work. He acquired the portable Malling-Hansen Writing Ball directly from its inventor and tried using it during his 1882 stay in Genoa. Nietzsche never did integrate the defective or damaged device into his regular practice but the experience left an impression. In a letter to close friend Heinrich Köselitz (also known as Peter Gast), he made the now infamous remark that "our writing tools are also working on our thoughts" (*unser Schreibzeug arbeitet mit an unseren Gedanken*). Friedrich Kittler—who repeatedly invokes Nietzsche's line in *Gramophone, Film, Typewriter* (1999)—reminds us that such philosophical perspectives are rare: "in contrast to illuminators, painters, scientists, historians, and poets", philosophers have largely neglected the "very medium" through which they conduct their reasoning (2009, p. 26). Thus, Nietzsche's revelation that the typewriter was "working on" or, perhaps more accurately for construction *mitarbeiten an*, "collaborating with" his thoughts is significant in the history of philosophy; he construes the "very medium" not as passive receptacle or vehicle for human thought but, rather, as a participatory agent in the thinking process.

In de-centering the human and affirming the autonomy of his writing tool, Nietzsche presages what has become known as the practice of media philosophy (*Medienphilosphie*). Though often considered a uniquely German enterprise,[1] media philosophy broadly conceived denotes an intellectually heterogenous and transcontinental pursuit[2] invested in how (often technical) media problematize and contribute value to traditional philosophical preoccupations such as ontology, epistemology, ethics, and aesthetics. Importantly, media philosophy is typically not so concerned with media representations, audience receptions, or, even, simply bringing philosophy to bear on media technologies (a philosophy *of* the media). Rather, media philosophy seeks to account for how media function as agential and autonomous things to *think with* insofar as they subtend, reshuffle, and inaugurate modalities of perceiving, thinking, and acting. Where some approaches emphasize the normative role of media play in a given historical *dispositif*, more speculative trajectories explore how philosophy might enter into a creative collusion with new media art and artificial intelligence to push the horizons of the thinkable.[3]

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What would a media philosophical computer game philosophy look like? Certainly, rather than bringing philosophy to bear on computer games (philosophy *of* computer games), addressing the philosophical import of computer game representations, or conducting inquiry into the "ontology" of the game, a media philosophical computer game philosophy would consider how computer games engender and enable modalities of thinking with and through media (technologies) that ultimately pertain to philosophical concerns. Timothy Barker's 'Cultural Techniques of Play: A Media Philosophical Approach to the Study of Time, History, and Memory in Games' (2019) and David Rambo's 'Contact Traces: On the Creative Technology of Videogame Gore' are exemplary in this regard (2020). Doing away with surface/depth or subject/object binaries, both understand computer game play as articulated through the intermediation of (human and non-human) materialities, agencies, operations, and significations. As Rambo puts it:

> Far from adopting a purely ludological or mechanistic perspective, the following conceives of gameplay as a technology that constitutes the game by mediating between the computer program, the hardware it runs on, its audiovisual presentation, haptic interfaces, and the player. Gameplay operates computational, experiential, and cultural depths in order to make the game exist as a legible, meaningful display (2020, p. 359)

Attending to computer game gore as a "coagulation" of these processes, Rambo proposes, pushes us to rethink the nature of representation beyond mimetic correspondence. More invested in temporality, Barker explores how computer game play works to produce modalities of subjectivation that afford the apprehension of properly digital conceptions of time. In doing so, he adds a wrinkle to Rambo's description of gameplay by theorizing play as a cultural technique (*Kulturtechniken*). With this, Barker implies that repeated play with time-critical computer games serves to cultivate lasting ways of thinking about and living in the postmodern world—a point this essay returns to. Hence, both scholars position technical media as condition of possibility for novel philosophical insight.

These approaches forwarding the speculative *potential* of the computer game's participation in the movement of thought provide a backdrop for this essay's discussion of claims forwarding the stultifying *limits* of computer games as things to think with. Specifically, the essay addresses an issue raised by the computer game's historical intertwinement with the military and industry: the extent to which these cybernetic machines, overdetermined by their techno-epistemic conditions, continue to perpetuate the ways of thinking from which they derived. The first section of the essay reconstructs parts of this history, drawing primarily on Claus Pias's computer game genealogy: *Computer Game Worlds* (2017).[4] It pays particular attention to how the prehistory of time-critical action games reveals their close relationship with and tacit optimization of player pre-reflective perceptual and sensorimotor capacities. The second section considers the lasting implications of the computer game's historical a priori vis-à-vis their propensity to train their users. It engages with Patrick Crogan's argument in *Gameplay Mode* (2011) that computer games are the "reproduction rather than simply the 'product' of […] Cold War mentality" and foregrounds his claims as important considerations for any attempt to think media philosophically with and through the medium (2011, p. 105). The essay concludes by recouping the very training function for which the computer game has been condemned. Drawing on

Mark Hansen (2000), my contention is that Pias and Crogan place in relief what I figure as a creative consequence of computer game play with implications for media philosophy: brokering our corporeal, pre-reflective adaptation to and, thus, agency within our contemporary lifeworld. It is by virtue of, not in spite of, computer games cybernetically working on us that they potentiate ways of thinking about and living in digital culture.

A Little History of the Action Game: Science, Industry, and the Military

Where do computer games come from? Scholars pose various stories of the computer game's genealogy: outgrowths from games as a cultural form, a facet of the history of leisure, another method of storytelling, another computational medium, an artifact in an affective archive, an instantiation of neoliberal capitalism, and so on. There's no one answer and, undoubtedly, the computer game as we know it today results from events detailed in all these (hi)stories as well as many yet to be told.

One way of telling computer game history attests to the medium's intertwinement with science, industry and the military. Overlooked by Anglophone game studies,[5] Claus Pias's attempt to answer the question "Why are there computer games at all?" provides one of the earliest and still most rigorous accounts in this vein (2017, p. 7). *Computer Game Worlds* traces the heterogeneous epistemologies, institutional practices, and technological developments that served as historical a priori for what we now understand as different genres of computer game: time-critical (action), decision-critical (adventure), and configuration-critical (strategy). Split into three parts focused on each of these in turn, the "Action" section of *Computer Game Worlds* traces a genealogy that concludes with the emergence of the media objects many consider to be among the first action computer games—*Tennis for Two* (Higinbotham 1958), *Spacewar* (Russell 1962), *Pong* (Atari 1972)—and passes through bodies of knowledge explicitly developed for and implicitly entangled with warfare and management sciences (2017, pp. 15-123). The following reconstructs some of these conspirations of history that gave rise to what Pias identifies as the four primary attributes of the action game:

1. Real-time control: "visual interaction between humans and machines [occurs] in real time."

2. Grammatized time and space: "play consists of producing temporally optimized sequences of action out of determined options."

3. User measurement: "[The computer game] produces and stores knowledge about its player in the form of data."

4. User optimization: Players not only have their responsiveness *tested* but also *trained* "regardless of whether score is being kept" (2017, p. 18).

Pias starts as far back as late nineteenth century German science:

> If the computer game can be said to test and train the sensorimotor capacities of their users, then, at the very latest, their prehistory began with Wilhelm Wundt's institutionalization of experimental psychology (2017, p. 18).

Wundt and student Max Friedrich made early attempts to measure subject reaction time as part of a pre-computational, telegraphic system. Not only did this media network prefigure "the basic circuitry of a computer" (2017, p. 20) but, as Friedrich regales vis-à-vis his advisor's reaction time improvements, it also precipitated the knowledge that human perception speed was not absolute. Rather, the experiments proved that perception and reaction efficiency could be "optimiz[ed] through training" or facilitated by altering the material dimensions of the sign (e.g. a number) being perceived (2017, p. 22).

Psychological experiments with animals in the US context further probed forms of testing and optimization not predicated on symbolic comprehension. Following years of examining pigeon, rat, monkey, cat, and ape intelligence by way of mazes and puzzle-boxes, comparative psychologist Robert M. Yerkes forwarded the thesis in 1916 that "problem solving could not be regarded as coincidental but rather as an indication of comprehension" (p. 23). This insight later came to answer a US military problem during WWI:

> How might it be possible to evaluate countless immigrants and the (mostly African-American) illiterate men who were active in the military without necessitating a grand expansion of bureaucratic effort? (1916, p. 25)

Data gathered from animal experiments informed the construction of exams non-English speakers or readers could demonstrate aptitude in. These tests determined potential recruits' mental fitness for the army without symbolic mediation.

Friedrich's measurement of the subject's reaction speed already implied an epistemological shift from research into the interpretation of semantic content towards conceptualizing the human as an optimizable functionary within a system. The army mental tests are of additional importance insofar as they not only mark a further theorization of aptitude not grounded in symbolic comprehension but also presage the implementation of user-friendly design:

> To a certain extent, illiteracy is the precondition for playing action games, which are based on the rhythmic feedback between audiovisual stimuli and sensorimotor reactions. It is no different in the case of user interfaces, which are not understood by reading handbooks or source code but rather by clicking and toying around, that is, by observing which stimuli lead to particular reactions on the screen. (Pias 2017, p. 65)

These advances in non-symbolic, self-descriptive depiction thus lay the ground for future graphically mediated human-computerinteraction. As is common in the history of media technologies, innovation arises to counteract perceived deficiency and to buttress the military.

What these early reaction-time experiments and aptitude tests lacked, however, was a means of conceptualizing or applying sequential and continuous tracking. To place movements like shooting a gun into a computer, one must break "apart continuous tasks into measurable (computable) units of time and space" (2017, p. 31). Indeed,

computer game play is all about adhering to what Alexander Galloway, borrowing from Philip Agre (2003), refers to as "grammars of action" (2006). Galloway explains:

> Video games create their own grammars of action; the game controller provides the primary physical vocabularies for humans to pantomime these gestural grammars. But beyond the controller, games also have their own grammars of action that emerge through gameplay. These grammars are part of the code. They help pass messages from object to object inside the machine's software. But they also help to articulate higher-level actions, actions experienced in common game occurrences such as power-ups or network lag. (2006, p. 4)

But before video games could "create their own grammars of action," actions had, in Bernard Stiegler's terms, to undergo "grammatization" (2014, pp. 54-56): the process by which language, gestures and bodies are rendered informatic by mechanical and industrial processes. That is to say, action had to be analyzed (broken down) and standardized before it could be transposed onto a computational platform.

Early twentieth-century scientific management stands out in its contribution to the grammatization process. Rather than measuring the best reaction times of particular subjects as Wundt and Friedrich's experiments did, Frederick Winslow Taylor's pursuit of workplace efficiency sought to produce models in general. The *Principles of Scientific Management* advocates for breaking down labor activities into standardized, temporal segments. Subsequently, these standards were to inform: the selection, training and development of the worker; cooperation between workers to ensure accordance with standards; and equal division of labor between the management and the workmen (Taylor 1919, pp. 36-37). Hence, Taylorism not only developed standards for action-in-time but also, in turn, recursively enforced those standards, rendering them actual and embodied through worker performance.

Frank and Lillian Gilbreth's motion studies were similarly preoccupied with streamlining the labor process but were less interested in time as they were in space: drawing up gridded overlays for work-stations and taking sequential photographs in a bid to identify and, consequently, eliminate unnecessary motion (1919). Gilbreths' motion charts served to standardize movement-in-space in addition to Taylor's standardization of movement-in-time (Pias 2017, p. 38).

Both projects forwarded proto-systems-theoretical approaches to the workplace. For example: Taylor understood workers as individuals performing particular functions within a larger system, the scientific principles effectively a heuristic for ascertaining how best to program that system; the Gilbreths, in measuring motion in general rather than workers and tools as discrete entities, simultaneously advanced a concept and a language that smoothed over the boundary between human and machine. Additionally, they considered worker motivation thermodynamically, thinking how the workplace could counteract motivational entropy through entertaining self-evaluation practices in which the workers tested their efficiency competing against workplace standards. Self-evaluation established a feedback loop not dissimilar to a game: standards providing the rules and goals, time-keeping devices the outcome. Such practices differ from cybernetic systems like the computer game only insofar as the feedback does not happen automatically in real-time.[6]

This way of thinking humans servo-mechanically—part of automatic systems that sense errors and deviations, correcting themselves through negative feedback—gained its clearest expression twenty years later in Norbert Wiener's cybernetics. It's instructive to address Wiener's brand of cybernetics as a response to a particular historical problem in the early 1940s: creating an anti-aircraft (AA) gun that could calculate and predict the flight path of an enemy plane. In this circumstance, the inner psychology of the enemy pilot mattered little—physiology and inner mental states could be black-boxed. What mattered was how accurately their movements could be anticipated. Referring to himself and Julian Bigelow in 1941, Wiener writes:

> We realized that the "randomness" or irregularity of an airplane's path is introduced by the pilot; that in attempting to force his dynamic craft to execute a useful manoeuvre, such as straight-line flight or 180 degree turn, the pilot behaves like a servo-mechanism, attempting to overcome the intrinsic lag due to the dynamics of his plane as a physical system, in response to a stimulus which increases in intensity with the degree to which he has failed to accomplish his task (quoted in Galison 1994, p. 236)

Hence, the elision of human and machine initially constituted a pragmatic route "to obtain as complete a mathematical treatment as possible of the over-all control problem, […] assimilat[ing] the different parts of the system to a single basis" (1994, pp. 251-252). As history tells, it was, however, only by virtue of a series of small leaps that Wiener and his team applied the cybernetic conceptualization to other areas: Allied anti-aircraft operators began to resemble the foe, then humans in general. Eventually, all worldly phenomena took on the character of a cybernetic system, making "an angel of control and a devil of [all forms of] disorder" (1994, p. 266).

Peter Galison argues that as cybernetics filters out into other contexts as a descriptive framework and a principle of system design, it behoves us to remember how Wiener's theory was originally premised on the picture of a particular kind of enemy:

> neither invisible nor irrational … this was an enemy at home in the world of strategy, tactics, and manoeuvre, all the while thoroughly inaccessible to us, separated by a gulf of distance, speed, and metal. It was a vision in which the enemy pilot was so merged with machinery that (his) human-nonhuman status was blurred. (1994, p. 233)

If humans and machines could be unproblematically analogized from a 'scientific standpoint' it is because the scientific standpoint of the 1940s was a perspective on men/machines at war (1994, p. 252). In Galison's reading, cybernetic thought, deterritorialized from its initial conditions, threatens to perpetuate something of that wartime, Manichean worldview.[7]

Wiener's AA gun never did come to fruition but a technical materialization of the cybernetic, human-computer interface nevertheless emerged on a large scale in another military context: the US's Semi-Automatic Ground Environment (SAGE). Originally designed in the late 1950s, SAGE comprised a Cold War effort to head-off Soviet attacks. Hooked up to radar equipment, mainframe computers converted analog signals into digital code and then, by way of cathode ray tubes, presented a

legible display. The computers developed tracks for the reported targets and automatically calculated which defenses were within range. Human operators interacted with the displays using light guns: selecting targets, available defenses, and issuing commands—automatically sent via teleprinter to the respective defense site. In toto, the SAGE project subsisted on the performances of a nationwide software, hardware, and human infrastructure and, in many ways, marked a progenitor of later personal computing networks (King and Zehner 2020).

For our purposes, SAGE clearly expressed several important media-technological developments vis-à-vis the action computer game: real-time control, graphical displays, and data storage. Less obvious is how SAGE's grammatization of time also served to optimize SAGE operators. As Pias explains, from the perspective of the computer cycle, all allies, enemies, humans, and machines had the same logical status in this environment:

> The rhythmic synchronization of users and screens in the case of games or interfaces, that is, the ergonomics of the computer, is … only a tertiary process that takes place on top of a primary synchronization of processor and bus pulses and on top of a secondary synchronization of interrupt orders and device requests. … [I]t is only at these moments that the user is given a chance to exist and to respond to the requests at hand. (2017, pp. 76-77)

To an extent, therefore, SAGE's logic of interruption made Wiener's cybernetic vision of the human as black-boxed information processor actual. Just as Wundt and Friedrich recognized that the machine measured much faster than the human—linking the stop watch automatically into the telegraphic circuit rather than having an observer monitor it—the operator was the slowest component in this massive information processing system. Long before software patching became ubiquitous, SAGE already tacitly patched its weakest, human links.

Several more developments needed to occur before action games such as *Spacewar!* (1962) could come into existence, as all entertainment does, through "an abuse of army equipment" (Kittler 1999, pp. 96-97)**:** above all, the appropriation of computational commensurability. You can't hack a thermodynamic machine like the steam engine—changing it into something else—because you can't manipulate the laws of thermodynamics. Conversely, digital computers can be manipulated to a number of ends—including quaint space battles between MIT students—by virtue of all channels being commensurable on one programmable system. It is this media-technical a priori that grants the human the appearance of now controlling the trajectory of their coupling with the computer. Indeed, if up until this point in the narrative, the position of the human in relation to their various machines has been one of subjection—the human optimized as a functionary within a broader apparatus—hacking seems to mark an inversion. However, as Pias points out, these creativities remain within a new set of parameters:

> The media-technical *a priori* of the hacker and the contingency of the hacker's playfulness are […] part of the universality of the Turing machine itself. Every symbolic operation of a computer is an example of "proper" use, and in this sense there are no "alternative" or "false" applications—there are only unrealized virtualities. Every running program is legitimate. There are no true or false games; at the most, there are game freezes and program crashes. (2017, p. 88)

But this is not to suggest that the hacking practices of the early 1960s that gave us the likes of *Spacewar!* were fundamentally compromised in any commonsense way. Rather, the implication of Pias's statement gestures towards the ineffectiveness of binaries such as use vs. misuse, complicity vs. subversion, domination vs. resistance when it comes to media technologies. Played with friends for fun or run as a framerate diagnostic, *Spacewar!* indiscriminately tested and precipitated the update of both human sensorimotor and computer hardware capabilities.

It would be several more years before computer games would begin their rise to major commercial success. Pias concludes his genealogy of the action game with Atari's *Pong* in 1972, a genealogy that attests to how the popular title was only possible in its time-critical form by the conspiration of historical developments in psychology, industrial management, cybernetics, military logistics and Cold War infrastructure. Hence, technological and epistemological innovations that responded to particular military or industrial problems and later trafficked in and across a variety of fields eventually found their way into arcades, bars and living rooms. Indeed, when Nolan Bushnell famously stated that "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" (quoted in Cohen 1984, p. 23), Pias reminds us that Bushnell was adding drunks and gamers to gorillas and illiterates in the list of those benefitting from the development of self-descriptive interfaces (2017, p. 117). Similarly, as the *Pong* player vies to integrate their self punctually into the ball's to-and-fro, they join the industrial worker, SAGE operator, and Friedrich's advisor in optimizing their perception and reaction timings so as to become faster information processors vis-à-vis the rhythms of the machine.

That said, *Pong* differentiates itself insofar as it places this process of machinic synchronization in relief. The goal of tennis, of course, is not to hit the opponent but to locate their absence. Just as the user only exists as part of the circuit by virtue of the logic of interruption, so too is it only at the time-critical moment of the ball contacting the paddle that the player can assert their presence in the game of *Pong* (Pias 2011). In this manner, the action game generatively refracts and renders legible some of the ways of thinking to which they owe their creation. The extent to which this refraction amounts to a reproduction of a cybernetic, predictive, and perhaps even a Manichean mentality is the topic of the following section.

Computer Games: The Only Winning Move is Not to Play?

Important about the histories of computer games we regale is how they furnish us with particular ways of conceptualizing them—ways that continue to have import in present practice and discourse. For example: understanding the computer game as an outgrowth of games as a cultural form leads to analyses that draw on pre-digital theories of games and play; figuring the computer game as a participant in the history of the computer invites application of digital media theory; tracing its connections to other storytelling media precipitates invoking narratological frameworks, and so on.

What import does genealogy inflected by industry and militarization have for continuing to think computer games in the present? The understated goal of

Computer Game Worlds is simply to trace how the computer game came into being. As Pias concludes:

> If it is true that fine motor skills and reaction speeds are as relevant to using actual radar screens and the interfaces of word processors as they are to playing action games; … and … if computer games can be said to derive from such diverse areas of knowledge as experimental psychology and computer science, meteorology and narratology, mathematics and electrical engineering—then it might indeed be permissible to speak of an "episteme of the computer game." (2017 p. 324)

The continued pertinence of excavating this episteme of the computer game is not easily transposed into the language and preoccupations of game studies. Indeed, Pias's approach is not invested in how we can interpret computer games hermeneutically or what social configurations they precipitate. Rather, drawing on the language of his former advisor, *Computer Game Worlds* asks questions concerning "the transference of epistemic processes to technical things" (2017, p. 9) so as to better understand how the computer game's specific hardware and software comes to inform "the very schematism of perceptibility" (Kittler 1999, xli). Therefore, Pias doesn't pretend to offer an answer to, say, what his analysis might mean for computer games vis-à-vis political struggle. As Geoffrey Winthrop-Young remarks regarding the grim disposition of German media theorists, often research into technological subjection is not about articulating forms of resistance but about "accept[ing] the inevitable without self-delusion[:] It is the moral obligation of prisoners, as it were, to study their chains so as not to mistake them for wings" (2002, p. 156).

Though Patrick Crogan does not cite Pias's monograph in *Gameplay Mode* (2011), his argument that the computer game not only owes much to a Cold War mentality but actively reproduces and disseminates it into popular culture probes the continued implications of the history Pias traces. His opening example of *Spore* (Maxis 2008) goes some way to exemplify his thesis. Where some computer games series have explicit military content (*Call of Duty* [Activision 2003-]) and others have clear, continued ties to the military (*America's Army* [United States Army 2002-]) or foreground their status as a training simulation (*Microsoft Flight Simulator* [Microsoft 1982-]), *Spore* is only tacitly redolent of militarism:

> It is there in the permanent warring across biological and sociocultural phases of *Spore* gameplay, in the routine terms for these modes (tactical realtime strategy), and in the game victory conditions (win the race to an objective or defeat the ultimate enemy). It is also to be found in less explicit ways, inhabiting the technological lineages of digital computing, visual displays and interactivity, virtual space simulation, and software development. It is there in the teleological tweaking of evolutionary principles that inform the key game dynamic of competitive creature evolution: game goals dictate the direction and prerogatives of evolution. (2011, pp. xii-xiii)

Moreover, deeply embedded in the simulational technologies that underpin *Spore* is that cybernetic *Weltanschauung*: "the impulse to model phenomena by hypothetically extending and extrapolating its future to see how that future may be predicted, modelled, and controlled" (2011, p. xiii). Therefore, game studies scholars—following

on from early figures such as Espen Aarseth (1997) and Gonzalo Frasca (2004)—have consistently erred in appraising computer games as cultural forms that offer critique or emancipatory flights of embodied play experience through simulation.[8] On the contrary, Crogan argues that the computer game's simulation of complex processes is, itself, intimately tied to and, moreover, reproduces a desire to predictively model and control reality. It is in this way that the computer game inculcates its user into what Paul Virilio refers to as logistics: "the procedure following which a nation's potential is transferred to its armed forces, in times of peace as in times of war" (Virilio and Lotringer 1997, p. 24).[9]

Of particular pertinence to a speculative media philosophy of computer games, Crogan proposes that the medium is unable to precipitate radical encounters with contingency because, inversely, computer games actively "play out […] the war on contingency" (2011, p. 36). Robin MacKay explains, "at its simplest 'contingency' refers to the attempt to think events that take place but *need not take place*: events that could be, or could have been, otherwise." As opposed to proceeding by rational necessity in the sense of being, in principle, predictable or "already written" "contingency, real contingency, is that which thinking can grasp only *as event*" (2011, p. 1). Subsequently, MacKay describes two ways in which indeterminacy becomes operative within a system of thought: on the one hand, as risk to be managed—an unpredictable occurrence reduced to pre-circumscribed parameters; on the other, as an event exceeding and transforming pre-circumscribed bounds. In computer game play, Crogan proposes that contingency or indeterminacy only ever appears as a risk to be managed:

> The logistical gametime […] deemphasizes the ethical positioning of the user/audience in favor of the demands of training for control. For fun, gamers repeat history in order to develop their control over events. They experience them ergodically—that is, as so many challenges modeled in the event space. Ergodic time prevails over the arrival of the event so that it always arrives in the familiar form of a recognizable and surmountable aporia to be negotiated in play, even when it is encountered for the first time (2011, p. 85)

Hence, even if computer games could be said to simulate contingency, play cultivates[10] a disposition towards that simulated contingency that forecloses radical, transformative encounters with it.

If we follow Crogan's analysis, is, in the words of Joshua from *WarGames* (1983), the only winning move not to play? Clearly, computer games—played on their own, industry designed terms—at best refract and at worst reinforce a Cold War epistemology; that is to say, they not only fundamentally render objects as targets, contingency as a manageable variable, and life as quantifiable and optimizable but also train players to think about the world similarly. Drawing on Stiegler, Crogan proposes that this "drive to foreclose the future" inherent in the computer game threatens to shut "off the future as such" insofar as it contributes to a technocultural milieu increasingly toxic to the vital individuation of the new (2011, p. xxi). Hence, the computer game contributes to what Stiegler, resuscitating Max Horkheimer and Theodor Adorno's theory, terms the standardizing and psychosomatically stultifying effects of the culture industry (2011).

That said, Crogan suggests that future battles for criticality against these overarching tendencies are possible but will largely take place in the realm of what, since the publication of Crogan's book, Stephanie Boluk and Patrick LeMieux have termed the "metagame" (2017). In other words, the only reparative trajectories for computer games, inextricable as their technical operation is from a militarized *weltanschauung*, lie in a social appropriation or an aesthetic reframing—examples of which might include placing a videogame as part of a theatrical performance foregrounding suffering (e.g. *Painstation* 2006) or putting it to an end unintended by its designers (e.g. DeLappe's *dead-in-iraq* [2006] performance piece). In Nietzsche's parlance, the way computer games autonomously work on our thoughts is largely reprehensible and, thus, we should do our best to work against them.

Are there ways to take the computer game's heritage into account without coming to the same conclusion? Can something generative still be made of this technology collaborating with our thoughts? In Ian Bogost's good spirited review of *Gameplay Mode* (2012), he lauds Crogan's rare account of "Cold War military technology's unseen influence on video games," one that should give us pause regarding even "the purportedly progressive uses of games for education and social good [that so often] wind up becoming attempts to account for their own future efficacy." He does, however, take issue with the conclusion:

> [T]he assumption that such origins can only ever stain the medium until we cast it off through the same predictable critiques leftist cultural critics have provided for decades. (2012)

As a counterpoint, he proposes that Crogan misses

> the fact that *logistics itself* is a toy worth playing with, a feature of the world that both haunts and intrigues us. In that sense, gameplay mode not only makes us complicit in the Cold War's logics, but also provides us with the pleasure—and the honesty—of fessing up to that complicity. (2012)

We can empathize with Bogost's desire to not take Crogan's convincing arguments as necessitating a wholesale rejection of computer gaming. Critical positions that condemn anything associated with something else deemed bad as complicit with it and, thus, not worth thinking about or engaging with are likely far more stultifying than computer games themselves. But in moving to recoup computer game play, Bogost makes a move common in games research that seems to run against some salient implications of Crogan's argument: reserving an arbitrary value for the practice of play. Play has always been a mode of activity particularly conducive to learning and part of Crogan's argument is that playful experimentation with technologies bequeathed by the history he tracks affect and transform us in ways that are difficult to comprehend. Moreover, might play in general—that experimental, 'as if' mode—lend itself precisely to the forms of predictive modelling Crogan urges us to be cautious of—playing out the future, as it were? Just as making a self-aware joke about what a terrible person you are and, nevertheless, continuing to be a terrible person doesn't really change anything, "[f]essing up to … complicity" (2012)—and, indeed, taking pleasure in that confession—seems at best a first step in coming to terms with the connotations of Crogan's thesis.

Conclusion: Recouping Computer Game Training

The essay's primary task has been to pose the computer game's military and industrial heritage as a problem for computer game philosophy. Claus Pias's *Computer Game Worlds* helped delineate some of the various epistemologies, technologies and contexts that, ultimately, proved instrumental for the emergence of the computer game. Clearly, the medium is, in many ways, founded upon responses to specific military and industrial problems. Indeed, it should not surprise us that the computer game and its tropes appear central to contemporary conflations of work and leisure when it derives from moments in twentieth century history that were, themselves, important on the road to new configurations of labor, technology, and selfhood towards the turn of the millennium. In the end, the question Pias raises for media philosophy is: how does the computer game's "very schematism of perceptibility" (Kittler 1999, p. xli)—the result of a "transference of epistemic processes to [a] technical [thing]" (Pias 2017, p. 9)—inform the kinds of thinking we can do with it? Crogan offers an answer to this question. In light of its military heritage, Crogan treats the computer game as a thinking machine that actively reproduces a Cold War mentality. Thus, Crogan effectively forecloses the speculative possibilities of the computer game vis-à-vis its autonomy as a technical object. Condemned as a stultification machine, social or idiosyncratic appropriation remain the only critical and creative ways forward.

That said, by framing the computer game as a machine that actively reproduces a way of thinking about the world and, in turn, trains its player to think similarly, Crogan provides a perspective that is itself media philosophical insofar as it attests to a way in which computer games work on our thoughts. He thus does some ground clearing for scholars wishing to probe how computer games train their players in ways not reducible to the paradigm he forwards. For example, how might non-normative microgenres of the computer game not predicated on mastering the future such as "walking simulators" (Kagen 2017) or "fumblecore" (Bryce Jones 2016) cultivate different ways of thinking about the world by virtue of their technical operation?[11] To adopt Bogost's term, a task for speculative media philosophical computer game philosophy moving forwards is exploring how, exactly, entering into complicity with these cybernetic, simulation machines might be generative because of, not in spite of, the ways they subjectivate their players. By way of conclusion, I want to offer a possible trajectory in this regard that pertains to the genealogy of the action game laid out above.

In summary, to trace the epistemological and technological a priori for the action game is, simultaneously, to trace a history of optimization techniques for the purposes of industrial and military efficiency. Often in this story, boundaries between human and machine blur as activities are conceived systemically: according to such concepts as speed, motion, energy, cybernetics, logistics, and so on. That said, the human frequently emerges as the weakest link necessitating recursive recalibration to keep up with the rhythms of the system—integrated as they are by virtue of the local work station or interface. Since Wundt and Friedrich's reaction experiments that measured the human by speed of response, these testing and training processes frequently articulated humans not as privileged interpreters of symbolic meaning but as another information processor in a system valued for their efficiency.[12] The SAGE operators epitomize how becoming information processor necessitates a disciplining

of largely non-conscious, pre-reflective abilities to perceive and react. Today, the computer game, seems to mark the apotheosis this history: if not to prepare players for war as Ronald Reagan once hoped, to capacitate them in a manner commensurate with the attention economy.[13]

Can the computer game's propensity to train its players—or, in Barker's terms, "cultivate" them—in a manner that largely circumvents their conscious apprehension be construed as anything other than exploitation? Certainly, in Pias's genealogy, such optimization occurs almost unanimously in the service of putting the human to work as part of a broader, value producing apparatus. I want to suggest, however, that it'd be throwing the disciplinary baby out with the capitalist bathwater to construe all forms of technologically facilitated training as ethically compromised a priori. Mark Hansen, drawing on Walter Benjamin, provides one way of moving beyond condemnation.

The purpose of Hansen's *Embodying Technesis* (2000) is to challenge the (then) widespread reduction of technology's effects to language by poststructuralism, probing instead how technologies fundamentally alter our sensory experience and drastically affect what it means to live as embodied human agents. Amid the various theoretical approaches to technology he takes issue with, Benjamin offers a saving grace with his writings concerning how technology delivers pre-verbal, material interventions ("shocks") to the human nervous system at a level below the neocortex, somewhere between the conscious and the unconscious. As N. Katherine Hayles summarizes:

> Hansen follows Benjamin in picking up on Freud's speculation about a "dead cortical layer" that insulates the neocortex from precognitive perceptions. Although Freud's neurophysiological speculations have been discredited, there is ample contemporary evidence from such researchers as Antonio Damasio that cognition extends throughout the body and includes emotions, kinesthesia, proprioception, and other sensations located in the lower brain, limbic system, and central nervous system. Although such sensations can be given verbal expression, they originate as nonverbal perceptions and need not be brought into language at all. (2000, p. vii)

By attending to these shocks, Benjamin and, subsequently, Hansen explore a realm of experience that precedes linguistic expression and representational consciousness, attesting to a way in which we encounter technology in its materiality.

In addition to accounting for the pre-verbal, material dimension of our relationship with technology, Hansen figures this material contact as a means of creativity—not merely another vista for colonization by capitalism. Specifically, Hansen explores how Benjamin ultimately poses a form of "mimetic corporeal agency" (Hansen 2000, p. 245). Innervations—the shocks given to the human nervous system by technologies such as cinema—serve to "train our corporeal, mimetic faculty to register the subrepresentational, molecular rhythms of the lifeworld" (2000, p. 245). Unlike conscious reflection, this mimetic training of a "certain bodily capacity […] [, a] degree of tolerance for shock" is an attunement that facilitates a way of living (2000, p. 248). The mimetic corporeal faculty thus emerges as a means by which the human brokers their embodied adaptation to and, thus, agency within their environment for life—populated as it is by technologies operating at speeds, scales, and temporalities

otherwise not cut to human measure. In other words, it is partly by virtue of this embodied adaptation that human perceptual ratios become cut to the measure of technologies that initially seem incommensurate with them.[14] Hence, if we are to conceive of subjectivity as a collective achievement by an ensemble of human and non-human agents—computational media affording access to a heretofore largely invisible "domain of sensibility" as Hansen explores elsewhere (2015, p. 5)—then cultivating mimetic corporeal agency constitutes a process through which the human comes to more actively participate in those ensembles.

Of course, the genealogy of the time-critical action game, like any history of humans and technology, is one of "epiphylogenetic" co-evolution (Stiegler 1998, p. 140): an unfolding, recursive reciprocity. From one perspective, the technology is increasingly refined to match the human: graphical mediation, self-descriptive interfaces, and real-time feedback. From another, the human user undergoes refinement: learning to act within grammatized space and time, to insert themselves into accelerating computational rhythms. Undoubtedly, various economic forces and state interests have hands in directing this co-evolution and, therefore, we should, as Crogan and Pias do, maintain a healthy skepticism of its tendencies. Nevertheless, the forms of life we live seldom afford thinking and acting in accordance with the connotations of technological critique. We may well condemn the exploitative effects of various technologies but, after that, we have to go on living with and through them anyway.

By attending to the industrial and military legacy of the computer game throughout this essay, it has been my intention to foreground and recoup its continued pre-reflective training function. Hansen's reading of Benjamin is instructive insofar as it suggests that the attunements of sense computer games perform cannot be reduced to the ends of military logistics or value extraction. Rather, they cultivate our corporeal, mimetic faculty in a manner that pertains to living more generally—exercising us so as to better accommodate the rhythms and ratios of our technologically proliferated lifeworld. It is in this way that entering into complicity with industry made computer games takes on a creative and agential import: developing a sensibility to the temporalities and grammars of digital media that might otherwise elude apprehension or overload attention. Play as the repeated practice of opening oneself to being worked on by the computer game thus constitutes a propaedeutic to media philosophy. This pre-reflective capacitation potentiates reflective, collaborative thought with, through and about digital media.

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Notes

1 Variously exemplified by Frank Hartmann's *Medienphilosophie* (2000), Sybille Krämer's *Medium, Messenger, Transmission* (2015), Bernhard Siegert's *Cultural Techniques* (2015), and Wolfgang Ernst's *Chronopoetics* (2016).

2 Outside the German tradition, influential figures dealing with the philosophical import of media include: Marshall McLuhan (1994), Gilbert Simondon (2017), Gilles Deleuze (1989), Vilém Flusser (2000) and, more recently, Bernard Stiegler (1998), Mark Hansen (2015), John Durham Peters (2015), Luciana Parisi (2019) and Yuk Hui (2016).

3 Exemplary in this regard is the work of Luciana Parisi (2019), Beatrice M. Fazi (2018), and Reza Negarestani (2018).

4 I am focusing on Pias's *Computer Game Worlds* because while the historical threads it traces intersect with the military, they are by no means reducible to it. His genealogy thus lends itself to my own arguments that wish to go beyond totalizing conflations of computer game training effects with militarization. That said, there are numerous histories of the computer game's military-industrial history that provide the backdrop for this essay's focus on Pias and Crogan's monographs (Lenoir 2000; Penny 2004; Lenoir and Lowood 2005; Dyer-Witheford & De Peuter; Stahl 2010; Payne 2016). Of particular note given this essay's concern with training is Anders Engberg-Pedersen's research into the training effects of nineteenth-century wargaming (2015) and the computer-based military simulation's status as an aesthetic exercise (2017).

5 The English translation of *Computer Game Worlds* (2017) started out as a Germanophone dissertation completed in 2000, the year before what is famously touted as "computer game studies, year one" (Aarseth 2001).

6 Notably, Pias forwards this as an historically important breakdown of the line between work and play: "games suddenly became work, and work became a game"; "*homo ludens* [synthesized] with *animal laborans*" to "form a new genre of being, one that was supposed to be embodied by the worker" (2017, p. 44).

7 While apropos for a specific constellation of cyberneticists, histories of science and technology have complicated this totalizing paradigm, forwarding cybernetics as a pluralistic enterprise politically, geographically, and epistemologically (Medina 2011; Kline 2009).

[8] Dennis Jansen elaborates on the game studies veneration of what they term "ludic cyborgism" in relation to Crogan's arguments (2020).

[9] Indeed, we might read Crogan's argument as an extension of Virilio's historically grounded analysis of the emergence of cinema and other imaging technologies as concomitant with evolving configurations of war—Virilio himself referring to computer games and other interactive simulations several times throughout *War and Cinema* (1989). For example, Virilio interprets *Custer's Revenge* (Atari 1982) as a transmogrification of orgasm into the blink of a red light (1989, p. 29).

[10] To return to Timothy Barker's conceptualization of play as a cultural technique, the implication of Crogan's argument is that computer game play fundamentally cultivates a militarized "way of living in and thinking about the world" (2019 p. 87).

[11] Brendan Keogh similarly poses computer games not predicated on mastery as an affirmative trajectory for future engagements with the medium (2018, pp. 167-192).

[12] This situation resonates with Martin Heidegger's warning that if philosophy concerns the preservation of truth and reasoned decision-making, then our current epoch bears witness to the transformation of philosophy into that which is not philosophy: the cybernetic pursuit of efficiency (1993).

[13] In *Interface Envelope*, James Ash argues that interfaces do not so much stultify as capacitate their users to better sense space and time "for the explicit purpose of creating economic value for the designers and creators of these interfaces" (2015, p. 3).

[14] On the discorrelation and recorrelation of the senses by digital media, see Shane Denson's *Discorrelated Images* (2020).