

Corporate Agriculture and the Exploitation of Life in *Portal 2*

Games and Culture

1-20

© The Author(s) 2016

Reprints and permission:

sagepub.com/journalsPermissions.nav

DOI: 10.1177/1555412016679771

journals.sagepub.com/home/gac



Melissa A. Wills¹

Abstract

This article examines the agricultural dimensions of *Portal 2* and two of its key paratexts, arguing that the game's potato motif functions as a satire of industrial agricultural practice, dramatizing both the vastness of corporate power and the plight of its silenced victims. I argue for an understanding of the potato as a biotechnological product, drawing from a range of contemporary and historical texts to establish its role in a long history of exploitation and social inequality. These aspects enable the game's establishment of a cohesive narrative in which potato science originates Aperture Science's ascent and growing corruption, in a trajectory that culminates in its brutal exploitation of human test subjects. The game also celebrates rebellion against that corruption through the dynamics of gameplay and the development of its main character as a rival biological power.

Keywords

Portal, potato, agriculture, biotechnology, science

Hence the richer nature's gift, be it potatoes, rice or maize, the more extreme the contrast between its dual activities, feeding and exploiting.

Redcliffe Salaman, *The History and Social Influence of the Potato* (1949, p. 600)

Oh, hi. So, how are you holding up? Because I'm a potato!

GLaDOS, *Portal 2*

¹ University of California, Davis, CA, USA

Corresponding Author:

Melissa A. Wills, Department of English, University of California, Davis: Voorhies Hall, One Shields Ave., Davis, CA 95616, USA.

Email: mawills@ucdavis.edu



Figure 1. GLaDOS in her potato atop Chell's portal gun.

To play Valve Corporation's *Portal 2* (2011a) is to spend much of one's time taking orders from a chatty, bossy potato perched upon the prongs of the gun framing the screen (Figure 1). This unlikely companion is transported by the game's protagonist, Chell, in her attempted escape from the underground labyrinth of Aperture Science, the corrupt company that has compelled her participation in the inhumane testing of its physics-defying, portal-shooting gun. The potato contains the remnant of GLaDOS, the tyrannical artificial intelligence whose relentless tormenting of Chell is the theme of the original *Portal* and much of its sequel, exiled into this tuberous prison by her successor. In her humbled form, GLaDOS is undeniably funny, with the transformation of her authoritarian power into the single volt of a potato battery and the reduction of her booming voice to a tinny whine. Fans have universally reacted with laughter and even affection, as evidenced by the outpouring of fan art, Internet memes, and merchandise commemorating "PotatOS" and her punchy one-liners. These sentiments are captured in the product description for Think Geek's build-your-own "PotatOS Science Kit," which reminisces, "Some of our fondest memories from *Portal 2* were of carrying PotatOS around the testing facility. We felt so close to her; it was almost like we were friends" (Think Geek and Valve Corporation, 2011b).

Beloved PotatOS, however, is not alone. Potatoes proliferate in *Portal 2*—variously bronzed, baked, rotten, and mutated—and likewise in the game's promotional materials and Valve-licensed paratexts. In all of these, potato references are irreverent and lighthearted, and it is perhaps for this reason that the pattern is seldom considered to be anything but an ongoing joke. This article will argue, in contrast, that *Portal 2*'s potatoes converge in a representation of corporate agricultural practice that is both funny and deeply critical. In setting the potato as emblem of

Aperture Science, the game unleashes the rich symbolism of a crop historically mobilized in violence and social exploitation. The humor of the motif overlays a critique of industrial agriculture that contrasts the totalizing power of the corporation against the precarious position of the lone, silent resister.

I begin with a historical discussion of the potato, identifying its recurring role in the social injustices and biotechnological conflicts that make Valve's crop of choice a fitting symbol for its agribusiness critique. Section two details Aperture Science's agricultural history, showing how the game and its key paratexts develop a corporate backstory that locates the company's bioethical transgressions in a founding commitment to potato science. Finally, the third section examines how the game conceptualizes an ethical stance against the corruptions of corporate agriculture through the dynamics of gameplay and the model of Chell as an idealized resister.

The Potato in Agriculture and Conflict

Potatoes initially appear out of place in Aperture Science's facility, as agrarian objects strangely placed in the sterile corporate chambers. But as this section will discuss, the modern potato is actually a thoroughly biotechnological product and a propitious symbol for this wayward corporation. My analysis is guided by a substantial discourse in science and technology studies concerning laboratory and agricultural organisms and which, stemming from Kohler's (1994) study of laboratory fruit flies, seeks to reconceptualize its objects of study as highly constructed, fundamentally artificial beings. Kohler writes:

Experimental creatures are a special kind of technology in that they are altered environmentally or physically to do things that humans value but that they might not have done in nature. Some are dramatically designed . . . reconstructed genetically through generations of selection and inbreeding into creatures whose genetic makeup and behavior are quite different from their natural ancestors'. These are the constructed creatures that most resemble spectrophotometers, bubble chambers, ultracentrifuges, and other physical instruments. (p. 6)

This representation of laboratory organisms as experimental technologies has inspired studies of Dolly the sheep (Franklin, 2007), mice (Rader, 2004), and tobacco mosaic virus (Creager, 2002), among many others.

Other scholars have sought to demonstrate the artificiality of more outwardly ordinary agricultural species like chickens (Squier, 2011) and the (transgenic) tomato (Haraway, 1997). These too arise from biotechnological processes, and I interpret the potato likewise as an engineered product perfectly at home in Aperture's facility. Like the chicken or the tomato, the modern *Solanum tuberosum* is the result of extensive agricultural manipulation. Since its first domestication in the Peruvian mountains some 7,000–10,000 years ago, it has been continually adapted through artificial selection to suit the varying needs of each new generation and

civilization.¹ Its pervasiveness in the modern food industry, however, reflects the success of the newer, large-scale crop engineering efforts that have supplanted traditional farming methods in academic and industrial food science laboratories. The potato is a particularly rewarding target for industrial research due to its ease of breeding and high degree of natural variability, and there are ongoing efforts to improve crop yields, flavor and texture, and nutrient efficiency as well as resistance to pests and bruising (Bradshaw, 2007; Millam, 2007). The result is a dizzying array of highly specialized strains as evidenced by the over 4,500 cultivars enumerated in the most recent edition of *World Catalogue of Potato Varieties* (Pieterse & Judd, 2014).

Experimental organism studies, however, go beyond simply identifying their objects of study as constructed bioproducts, also drawing attention to the new social configurations produced through their creation. The chicken, for instance, can be understood as “a product of cooperation and collaboration between biological and embryological researchers, the universities, the Cooperative Extension Services and 4-H Clubs, the emerging fields of advertising, public relations, and marketing and the new vertically integrated grocery and poultry industries” (Squier, 2011, p. 52). Engineered organisms thus reflect the novel technoscientific regimes that have stakes in their success. Yet these regimes are not always so benevolently collaborative as Squier’s formulation indicates, for interrogating species in this manner also draws attention to the forces contending for their control and appropriation. Potatoes prove this point exceptionally, as this crop—more than tomatoes, chickens, mice, or sheep—has been consistently mobilized to propel dominant groups to power while suppressing, sometimes violently, their vulnerable opponents.

Historically, the potato has figured prominently in narratives of social progress, being represented as a tool in the ascendancy of national powers. Salaman’s (1949, p. 11) definitive potato history cites the domestication of the wild potato as key to the ancient Peruvians’ geographical expansion beyond their jungle habitats, writing that through it “man solved the problem of how to live at great altitudes, and thereby attained the mastery of a continent.” For Salaman, mastery of the continent meant social as well as natural dominion, with the potato initiating a political rise culminating in the Incan empire. Numerous recent popular histories follow Salaman’s lead in emphasizing the potato’s role in nation-building enterprises following its export to Europe in the 16th century; they narrate efforts by prominent national leaders—including Frederick the Great, Louis XIV and Marie Antoinette, Catherine the Great, and more—to introduce government-led planting initiatives as a means of feeding their poor and improving overall national health. These histories therefore cast the potato as a primary contributor to Europe’s rising prosperity and the Industrial Revolution (see, for instance, Zuckerman, 1998; Smith, 2011; and Reader, 2008). In a more measured but no less celebratory claim, a 2011 economics article seeks to quantify “the impact of potatoes on Old World population and urbanization,” concluding that potatoes alone were solely

responsible for approximately one-quarter of growth and urbanization from 1700 to 1900 (Nunn & Quian, 2011, p. 593).

Yet the potato's legacy as builder of empires also allowed it to become a tool for social and political control, given the large populations that depended on it as a staple food. In sixteenth-century South America, Spanish conquerors exploited the native people's dependency on the crop, meting out potatoes in exchange for slave labor in their silver mines in what Salaman calls "the classic example of large-scale industrial exploitation" (p. 206). In European military campaigns, potatoes were sometimes a target of invading armies' efforts to both feed themselves and drain the local food supply, as in the case of the War of Bavarian Succession (the *Kartoffelkrieg* or "potato war"). Most famously, in nineteenth-century Ireland, the potato became a locus of political control: the destruction of the blight exposed both the peasant population's complete reliance on the crop and the extent to which that reliance derived from the oppressive labor and legal practices of those in power. And during the Cold War, the mere rumor of an American scheme to drop potato-eating beetles targeting the food supply of enemy countries prompted Germany into an actual retaliatory attack on English potato fields (Garrett, 1996). In all of these cases, military or political power is acquired specifically through exploiting the dependency of the lower classes on potato crops. *Portal 2*'s agricultural critique, as I will show, echoes these historical precedents in framing Aperture Science's corporate ascent as the product of both potato science and potato exploitation.

Contemporary America does not face the same vulnerabilities as past civilizations, but as agriculture has shifted toward industrial farming, the potato has continually functioned to highlight power differentials between industry and consumer. Consumers are left facing new perceived vulnerabilities in the form of bioengineered foods, with the conflicts of the past reemerging in the form of controversy over the status of the potato itself. The tuber has played a formative role in the establishment of a wider opposition between companies and consumers, as two brief examples will help illustrate. First, the potato featured prominently in the first public controversy surrounding genetically modified organisms (GMOs), at Tukulake, California, in 1987. Here a crop of potatoes was sprayed by UC Berkeley researchers with an organism dubbed Ice Minus, a *Pseudomonas* bacterium genetically modified to protect plants against frost. The project instilled the enduring fear that GMO testing would override consumer opposition, in the researchers' decision to proceed despite an early lawsuit by concerned local citizens. The subsequent uprooting of some 3,000 potato plants after the first spraying revealed the persistence of discomfort with the project (Maugh, 1987); the researchers' replanting of those same plants only fueled the perception of consumer powerlessness. The episode was to become iconic in the anti-GMO imagination as journalists captured otherworldly images of scientists walking among the plants in protective plastic suits, bolstering the suspicion that there was something alien—not to mention toxic—about the entire enterprise.²

Less than a decade later, transgenic potatoes themselves would enter the nation's food supply in another formative controversy. Monsanto's NewLeaf potato, a russet Burbank incorporating a bacterial gene conferring resistance to the Colorado potato beetle, was introduced in 1995. Despite vocal protests, it was integrated into the fast-food supply chain without labeling. Frustration with the impossibility of avoiding the NewLeaf played a major role in its widespread public opposition, and the incident persists in the popular imagination even though the crop was eventually pulled from the market. Pollan (1998) voiced the increasing distrust of GMOs in an article recounting his planting of a NewLeaf variant in his garden, terming it "creepy" and suggesting that "any Colorado potato beetle that takes so much as a nibble of my New Leafs will supposedly keel over and die, its digestive tract pulped." Although Pollan's own research had informed him of the plants' safety, he could not bring himself to eat them, concluding the piece with the image of "a bag of biotech spuds" sitting on his porch, uneaten. Shortly afterward, Ruth Ozeki's 2002 novel *All Over Creation* featured the genetically modified NuLife potato in a thinly veiled retelling of the NewLeaf controversy, indicating the enduring tensions activated in that debate.³

The Ice Minus and NewLeaf episodes have been influential in the growing opposition between food companies and consumers regarding GMOs more generally. The perception that food companies systematically suppress public concerns has become a political reality in the years since, as Nestle has detailed in *Safe Food* (2003). Nestle argues that the food industry, rather than addressing consumer fears about the health and environmental effects of bioengineered foods, has sought to institutionalize their dismissal through "the politics of government oversight" (p. 194), in which companies have successfully convinced regulatory agencies "that questions about societal risks and benefits do not need to be addressed before planting transgenic foods, that the foods require no special labels, and that the public has no choice about whether to consume them" (p. 193). The foreclosure of open dialogue, she suggests, only further drives distrust and outrage over GMOs: the silencing of protest has become policy. To Nestle's analysis, I would add a more recent development immediately preceding *Portal 2*'s release, the Supreme Court's ruling in the controversial Citizens United case in January 2010, which paved the way for unlimited corporate election financing. While not specifically targeted to agri-business, it increased fears that food corporations would use their new political power to push through controversial legislation, further silencing consumer protest. Recent elections have seemed to bear this out, as in the case of California's 2012 Proposition 37, a GMO-labeling initiative that was widely viewed as being defeated by the collective US\$46 million investments of Monsanto, DuPont, and others (Behrsin, 2013).

As this brief history has shown, the potato can be understood both as a fully biotechnological product and as a vehicle for social control. *Portal 2*, I argue, draws on the rich symbolism of the potato in framing Aperture Science's corruption as a recapitulation of these familiar power dynamics. The second game reimagines the

company as having significant agricultural investments, and Aperture's wielding and weaponizing of the potato dramatizes both the vast reach of corporate agriculture and the powerlessness of the silenced resister. *Portal 2* is not the first video game to critique industrial agricultural practices through satire. Molleindustria's (2006) *McDonald's Video Game* tasks the player with increasing company profits by overseeing multiple domains, explicitly rewarding unethical decision-making in each sector, a procedural rhetoric that Bogost (2007, p. 31) identifies as exposing "the necessity of corruption in the global fast food business" and particularly "the necessity of overstepping environmental and health-related boundaries." The game does not involve potatoes, but it does begin in the agricultural sector, where the player quickly finds that switching to GMO soybeans increases profits.⁴ While *Portal 2*'s critique is more expansive and nuanced, it shares with its predecessor the representation of bioengineered foods as the watershed from which more egregious transgressions flow.

Aperture Science is Potato Science

The *Portal* series does not overtly present Aperture Science as an agricultural company but rather as developing an eclectic mix of products, from shower curtains to moon rocks and now weapons. Indeed, the company's location deep underground in the postapocalyptic Half-Life universe would seem to reduce agriculture to the distant memory of a lost cultural past. Yet the second *Portal* game and its official paratexts subtly integrate potatoes into the narration of Aperture's past and present corruptions.⁵ The agricultural story line is fleeting, developed through an array of scattered hints and references that nevertheless converge into a coherent backstory. Its structure therefore conforms to the model of other hidden narratives developed in the series, which Wendler (2014, p. 365) describes as demanding player cocreation in the assembly of accumulated clues, compelling the player "to construct a conforming, salient narrative that resolves those loose plot threads in a neat, tidy way." My method in this section differs from Wendler's only in the inclusion of particular paratexts; otherwise, I follow his lead in resolving the loose threads of *Portal 2*'s potato motif into the story of Aperture's ascent.

The game's chronologically oldest potato appears as a relic lingering in the lobby of the company's earliest test chambers. Here Chell discovers a display case housing a bronze potato trophy, mounted on a stand with a plaque identifying Aperture as the winner of the Spirit of Idaho prize from the "National Potato Board for the promotion of Potato Science, 1955" (Figure 2). It appears alongside other assorted memorabilia from Aperture's past, most of which represent elements of a cohesive, if fragmentary, corporate history: an imposing portrait of founder Cave Johnson along with a salesmanship award from his pre-Aperture days, a series of awards from the company's early years, and a newspaper page announcing Johnson's purchase of the salt mine in which Chell is presumably standing. The Spirit of Idaho award does not fit obviously into this history, nor does it specify the nature of the company's commitments to



Figure 2. 1950s era display case with the Spirit of Idaho prize.

potato science. Yet its placement in the display case clearly indicates its role in Aperture's narration of its own origins, signaling a foundational affiliation with corporate agriculture; the impression is strengthened by the fact that the trophy visually resembles an Idaho potato, the variety chiefly made into French fries. Given the history of empire and exploitation that I have outlined, the trophy also signals a certain moral register, identifying potato science as the origin of future bioethical violations.

By the time young Chell enters the facility some decades later, it is evident that the company's early investment in potato science has paid off in the form of agricultural surplus, a condition players were primed to recognize even before the game's release. The theme of potato abundance was initiated in the promotional release of Valve's alternate reality game *Potato Sack*, a bundled series of independent video games that were rife with irreverent tuber jokes. The series additionally awarded players up to 36 potato icons in Steam for completing certain tasks, which were then aggregated across users in the game's final stage titled *GLaDOS@Home*. This collective potato gathering was framed as a process of cooperatively rebooting GLaDOS after the events of the first game, triggering an early release of *Portal 2* and foreshadowing the agricultural theme I have been discussing: more potatoes, more energy, more GLaDOS. *Potato Sack* players were quick to pick up on the theme. One user at the fan site *Giant Bomb* posted an image of a paper on which was scrawled PORTAL TWO, with the R, L, and W scratched out to reveal "POTATO," above a caption reading "For those of you still wondering what potatoes had to do with Portal 2" (Gamer_152, 2011). The post implies, much as I argue below, that the game both contains and is partially defined by the potato.

The potato's natural fecundity has historically brought with it the problem of industrial oversupply, and by this standard Aperture is certainly an agricultural

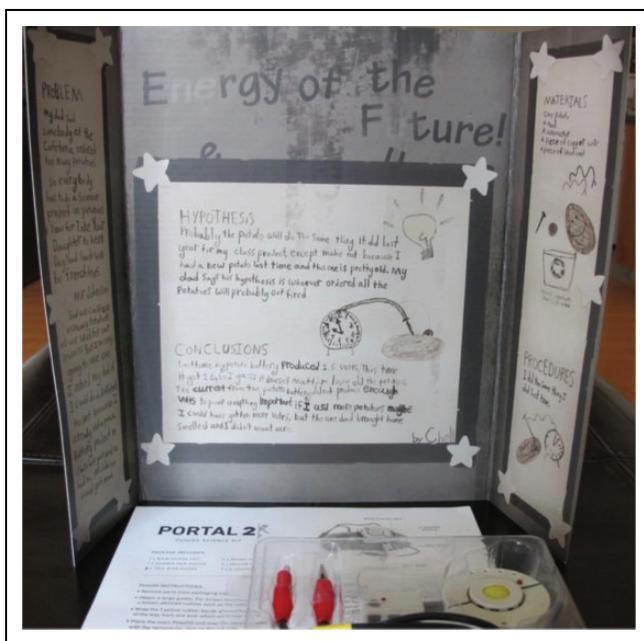


Figure 3. Reconstructed poster and battery components for ThinkGeek’s “PotatOS Science Kit.”

success in the narrative of the game proper.⁶ Potatoes abound, from PotatOS and the bronze trophy to the wreckage of the Take Your Daughter to Work Day science fair with its long file of 40 nearly identical potato battery projects. The repetition of the fair projects suggests that the event was more an exercise in potato waste consumption than in creative thought, an impression solidified in the Valve-licensed reconstruction of Chell’s poster (Figure 3) that is packaged with the PotatOS kit.⁷ In it, she writes:

PROBLEM: My dad said somebody at the Cafeteria ordered too many potatoes so everybody has to do a Science project on potatoes now for Take Your Daughter to Work Day and lunch will be french fries.

Mr. Johnson said we could use as Many potatoes as we liked for our projects But I’m only going to use one. I asked My dad if I could do a different project because I already did a potato Battery project in class last year and he said no, Mr. Johnson would get mad. (ThinkGeek, 2011a and Valve Corporation, 2011a)

Her statement reveals that the daughters are expected to consume surplus produce not only through the reperformance of a mundane exercise (using “as Many potatoes as we liked”) but also through physical ingestion. Elsewhere in the poster Chell

remarks that her potato “is pretty old” and that “the one dad brought home smelled.” Yet this is lunch: French fries, the very symbol of corporate agriculture and the food at the center of the NewLeaf GMO controversy—and fries made from old, smelly potatoes at that. While these children are likely not nutritionally dependent on potatoes in the same degree as the European peasants of the past, in being asked to consume *only* potatoes their situation echoes their predecessors. The implication of Mr. Johnson’s language of threat and compulsion is a further parallel, drawing out the unequal power relations that converge in the potato. As a whole, the project requirement also works as an enforced affirmation of corporate identity, with the daughters engaging in a symbolic activity that reasserts the fundamental origin story of Aperture itself. Their batteries recreate the corporate logic in which power, both electrical and social, is seen to arise from the manipulation of agricultural life.

The theme of forced potato consumption reaches a militaristic climax when read through the *Lab Rat* comic (Valve, 2011b) published ahead of *Portal 2*’s release. The comic depicts GLaDOS’ catastrophic ascent, beginning with her request for the neurotoxin she will use to gas the facility on Take Your Daughter to Work Day, killing or imprisoning the entire population. Notably, the massacre coincides with the abundance of smelly, old potatoes—potatoes which likely contain solanine, a neurotoxic compound abundant in the sprouts and greenish skin of aged tubers.⁸ Forensic-minded fans have eagerly assembled the clues into theories sourcing GLaDOS’ neurotoxin to the rotting science fair projects or to Chell’s potato in particular. Reddit user VInethrel (2015), for instance, speculates that “Solanine can be derived from potatoes being exposed to sunlight. What’s growing in the Aperture science basement? Potatoes. What are the hard light beams made of? Condensed sunlight. That means GLaDOS has an easy way to make neurotoxin.” Commenters on VInethrel’s thread have been intrigued but perplexed as to how GLaDOS would have acquired the neurotoxin in advance of the science fair, a dilemma potentially resolved by my suggestion that Aperture was in fact already overloaded by potatoes by this time. The company’s early investment in potato science thus culminates in the forced consumption of that very product, with the victimization of Aperture’s employees reprising the suffering of the Potosí miners and the Irish peasants, literalizing Salaman’s assertion that the crop is “a weapon ready forged for the exploitation of a weaker group in a mixed society” (1949, p. 600).

With the ascent of GLaDOS, the power struggles conventionally associated with the potato are crystallized into their purest form. Aperture’s agricultural emphasis recedes but biological testing survives, with Chell and the other test subjects replacing potatoes as the organisms of interest. As there are no longer any human administrators left to draw a profit, what remains is testing for testing’s sake in the assertion of raw power. The remaining humans are reduced to their functional utility in GLaDOS’ endless weapon testing: battered, burned, and at last thrown away like so many old, stinking potatoes.⁹ GLaDOS’ infamous remark upon finding herself in a potato—“Oh hi. How are you holding up? Because I’m a potato!”—might then

stand in, metaphorically, for all who are subject to Aperture's regime. But while the shift to GLaDOS' rule might at first seem like a radical break for the company, the potato motif I have been tracing stages her ascent less as a deviation than an intensification of abuses already in progress. There is no accident in GLaDOS' control; it is rather the horrific finale of a history of wielding potatoes as a means to power, the fulfillment of a narrative arc initiated in the Spirit of Idaho prize and sustained through the science fair and neurotoxin attack.

The transformation of GLaDOS into PotatOS reaffirms this narrative arc in emphasizing the potato as the symbolic center of Aperture Science. For much of *Portal 2*, Chell allies with Wheatley, an artificial intelligence core that she substitutes for GLaDOS in an effort to overthrow the power that imprisons her. His betrayal is immediate. Intoxicated with power, he banishes GLaDOS into the potato, rendering her precariously embodied, subject to bird attacks and dependent on Chell's goodwill. But Wheatley's dislocation of the potato from the center of Aperture Science is ultimately useless, and symbolically so, as under his inept control the facility begins to crumble, threatening total destruction. His regime confirms that Aperture and the potato are functionally inseparable. Indeed, the gamer's task in the second half of the game is to return GLaDOS—and the potato that contains her—to the core of the facility. As in *Potato Sack's GLaDOS@Home* stage, there is no Aperture without the potato. Underscoring this equivalence, the restoration of PotatOS is the last thing the player (as Chell) actively does, with the repair of the facility and Chell's release both playing out in the concluding cutscene.

Even Chell's final release serves as a reassertion of agricultural dominion. As the game ends, she finds herself standing alone in a sunlit and interminable expanse of wheat. The potatoes belowground, in other words, have been replaced aboveground by another product of corporate agriculture that hems her in on all sides. It is an escape but hardly a victory. Chell herself is undoubtedly damaged by her efforts and, according to the rest of the Half-Life universe, entering an apocalyptic, riven world.¹⁰ Meanwhile, far below the surface GLaDOS has deleted the programming that weakened her and is free to reset the facility for new rounds of testing now that her greatest challenger has been expelled. Industrial agriculture resumes, unchanged.

Rebellion

It is worth restating at this juncture that *Portal 2's* potato motif is primarily comedic, with its bleak assessment of agri-business disguised beneath an ongoing and irreverent joke. It is certainly in this vein that it has generally been received, as evidenced in the widespread fan affection for PotatOS. But as this essay has been arguing, Chell's world is in many ways a recapitulation of our own in its depiction of overreaching corporate power and its staging of the potato as a vehicle for human exploitation. It would thus be a mistake to conclude that the joke is the entire point or that the potato motif conjures a speculative world so remote in time and morals from

our own that it can be kept at a safe distance from our everyday lives. Rather, the game's critique emerges from the humorous, satirical exaggeration of the conditions of our time.

But *Portal 2* does not merely use satire to reflect industrial agriculture's power as does its predecessor in agricultural critique, *McDonald's Video game*, which unilaterally emphasizes the range of corporate transgressions. *Portal 2*, in contrast, significantly shifts the critique in reversing the player's position from corporate pawn to corporate victim, using the first-person perspective to dramatize the visceral and emotional consequences of those transgressions. In casting the player as Chell, the game brings to life—though satirically intensified—the experience of the fearful consumer living in the grasp of industrial agriculture. The silencing of protesters, from Tukulake's potato farm to Citizens United, finds expression in Chell's mute rebellion with the fears of ingestion translated into bodily violences. Galloway (2006, p. 78) has argued for a reassessment of realism adapted to game studies, one that replaces the requirement of visual realisticness with a requirement of “some kind of congruence, some kind of *fidelity of context*” that resonates with the conditions of the player's life.¹¹ I contend that *Portal 2*'s agricultural critique works in just this way, allowing the player to recognize through comparison the “everyday struggles of the disenfranchised, leading to a direct criticism of current social policy” (Galloway, 2006, p. 80). Although overlaid with satire and set in a wildly dystopian future, the game indeed has a realist mission at its core, drawing the player into its critique by constructing fidelity with the corporate violence it satirizes.

It is also through the first-person victim perspective that the player becomes an active participant in the game's critique. Aperture Science's corruptions are not merely observed but also felt through the particular immediacy of the video game medium. It is through embodied gameplay that the player *experiences* for a time the ruthless brutality of a corporation's failure to discriminate between plant and human bodies, becoming part of the exploited population. And in this body—through fingers on the keyboard and decibels in the ears—the player perceives Valve's vision of corporate abuse playing out. The player, through Chell, registers Aperture's ethical transgressions through their transformation into physical form, feeling the thud of bodies crashing to the floor, seeing blood splatters after being hit by a turret laser beam, and hearing the booming voice of Aperture's scientific authorities shouting derision and commands. And so to a degree and for a time, the player lives through it, inhabiting a body that cannot die in its endless regeneration as test subject.

Yet even as the game conscripts the player into the experience of victimhood, it also enacts the experience of resistance. From the earliest moments of the *Portal* series, the games train an overt disregard for the instructions of GLaDOS, the voice of corporate authority.¹² Following her directions leads only to death by neurotoxin and fire; there is no progression through the game except by stepping outside of the rules. The structure of the first game confirms this, as the numbered test chambers

turn out to have been preparatory for the player's escape from the chambers and ultimate challenging of GLaDOS herself. Consalvo (2007) has written that video game culture has long circulated strategies for gaining advantage by breaking the rules. But while accessing Easter eggs or consulting paratextual materials like game guides requires detouring away from the main action of the game, in *Portal 2* the rule breaking is the game itself, a skill to be mastered and directly rewarded.

Beyond the experience of gameplay, the player also becomes an active participant in corporate resistance through the narrative structures of the games. Wendler's (2014, p. 354) argument that the two games require "direct, creative input from the *player* of the game" to assemble their subplots understates the extent to which these stories are subversive in the context of the game. The narratives he outlines—GLaDOS' corruption in the first game and Chell's identity in the second, to which I would add the potato motif—are "subsumed, implied, unscripted" *because* they contradict the perception of GLaDOS' authority. It is in her interest to suppress indications of revolt and unrest, and so these story lines are necessarily hidden under her control. The task of the player is to find and assemble clues, even and especially when they question the knowledge handed down from authority figures. In this sense, the narratives of the games demand a rebellious player participation.

While embodied gameplay and entrained rule breaking involve the player in the construction and recognition of the game's critique, the fullest expression of an opposition to the transgressions of corporate power—and specifically in the agricultural realm—is the idealized figure of Chell. For most of the *Portal* games her character is an impenetrable blank, but it is specifically within the second game's potato motif that her personal identity and intellect are established more robustly. Her bold resistance is shown to have originated in a formative interaction with the emblematic product of Aperture Science, and it is through the potato that the company's outsized power finds a rival in Chell's outsized rebellion. Like her enemy, Chell is an exaggerated figure, unwavering in her ideals and in possession of startling biological power. But despite her exaggerated heroism, Chell's answer to corporate corruption models a serious ethical resistance that is the game's counterpart to the industrial system it critiques.

In her own interaction with Aperture's potatoes, Chell is depicted as a lifelong skeptic of corporate authority, exemplifying the rebellious thinking the game demands of its players. As I have noted earlier, the succession of identical projects in the Take Your Daughter to Work Day science fair suggests an obligatory exercise designed to affirm corporate authority and dispose of a surplus under the cover of celebrating young scientists. It also conveys the expectation of compliance and intellectual conformity that the company demands of its visitors and test subjects, an expectation that is restated in-game through Wheatley's scathing denunciation of the sole nonpotato project, a baking soda volcano: "It's not terrifically original is it, you know what I mean? Not exactly primary research . . . I'm guessing this wasn't one of the scientists' children, you know, I don't want to be snobby but let's be honest. It's got manual labor written all over it, hasn't it." Chell's project, too, turns

out to be a deviation from the expected protocol but in a deliberately subversive manner. Her rebellion signals not only an unwillingness to comply but also a rejection of Aperture Science itself, potatoes and all.

Chell's project reflects a superficial performance of the role of diligent fair attendee. She did, in fact, bring a potato battery project along with a poster bearing the expected sections and labeled with her name. Her chosen title, "Energy of the Future!" is accompanied by diagrams illustrated with smiling cartoon potatoes, all of which echoes the company's cheerful and constructive public persona. But for *Portal 2's* idealized resister, actual conformity is impossible. Valve's reconstruction of the poster represents Chell unambiguously as a sharp and sarcastic child, already prone to impatience with the expectation of obedience. It is evident that she has seen through the pretense, finding nothing novel in a project that turns out to be the compulsory repetition of a protocol she's already mastered. Her flatly stated hypothesis that "Probably the potato will do the same thing it did last year" is followed by a terse statement in the Procedures section that "I did the same thing I did last time." Further, as is clear from the comments about the French fries lunch cited earlier, Chell has correctly identified the actual situation motivating her experiment. Her Problem section mentions nothing about electrical voltage and poses no experimental questions: the "problem" she recognizes is rather a management problem of too many potatoes, along with the problem of angering Mr. Johnson with noncompliance. Even at a young age, she appears impervious to and resentful of the company's expectation of mindless rules following disguised as scientific training.

Years later, any overtures of compliance have been stripped away. Chell's return to the site of the science fair in the real time of the game reveals her potato battery to have been her first, symbolic challenging of Aperture Science through the company's own agricultural product. The potato standing before her poster is anything but ordinary, having sprouted into impossible proportions with offshoots extending downward to the floor and upward into the rafters and out of sight. Its battery components are no longer visible; these last vestiges of compliance have been shed (Figure 4). Both versions of Chell's poster depict a tub marked with the Aperture logo and captioned "special ingredient from dad's work." The ready implication is that this mystery ingredient must be responsible for the potato's out-of-control explosion, in keeping with the company's development of mysterious gels with outsized powers as depicted in *Portal 2*. On the one hand, the presence of the ingredient could be seen as innocent tinkering with unexpected results; one might then interpret the superpotato as a validation of Aperture's powers in laying bare the transformative potential of its own products. But Chell's own sarcastic voice in the reconstructed poster, along with all of her actions throughout both games, works against this interpretation and suggests the intentionality of her actions. The placement of the special ingredient further implies deliberate action. In both posters, it is drawn in the Materials section but not *listed* there verbally as the other components are, nor is it included in the Procedures or in the diagram of the completed battery.



Figure 4. Chell's superpotato and in-game science fair poster.

The only clear thing, therefore, is the subversive intent: Chell has seized something from the company and used her poster to announce that seizure.

Furthermore, her actions signal a targeting of Aperture Science itself. In possession of the special ingredient, young Chell presumably could have used it at home in any number of ways but instead chose to apply it to a potato, in defiance of protocol, and to bring that potato deep underground into the facility. The action implies a rebellion that functions metonymically as an assault on Aperture Science itself through its emblematic product. It marks her as a rival potato power in her own right, announcing a fundamentally different perspective. Chell has created, that is, a fantastically immense sprout of her own, an unseeing botanical *eye* opposing the ubiquitous eyes of Aperture's cameras and lethal turrets. Later, following his ascent to power Wheatley recognizes Chell's childhood rebellion as both potato experiment and corporate threat. His creation of PotatOS functions as an explicit rebuke, indicating that Aperture has registered the superpotato as a danger. He delivers PotatOS with the admonition, "See that? *That* is a potato battery. It's a toy for children. And now, she lives in it." He hands Chell, that is, a proper potato battery, one of appropriate size and wattage; at 1.1 volts, the battery scarcely powers GLaDOS' communication. That Wheatley vastly underestimates the power of Chell's and PotatOS' alliance does not undermine the significance of his reproach.

Defiant action and skepticism of authoritarian voices are Chell's trademarks throughout the *Portal* games, but it is through the science fair detour in the sequel that they are narrated firmly into her childhood. We therefore come to see them as foundational, and her potato project as an originating moment in her eventual challenge to GLaDOS. Just as the bronze trophy signals the start of Aperture's enduring ethical corruptions, Chell's superpotato initiates a trajectory of resistance that

represents a conscientious stance against corporate agribusiness. It serves as a harbinger of her later rebellion, foreshadowing the material threat that she herself will eventually pose to the facility. As a test subject, she has learned to turn the portal gun against the facility where necessary to effect her escape, just as her superpotato has insinuated itself into the material infrastructure of her prison, threatening its structural integrity. Wheatley himself acknowledges this significance in reacting to the sight of her monstrous project: “That’s growing right up into the ceiling. The whole place is probably overrun with potatoes at this point, isn’t it.”

Further, the superpotato operates figuratively in affirming Chell as a biological power rivaling GLaDOS herself. In *Portal 2*, Chell encounters GLaDOS’ neurotoxin generator directly after her detour through the science fair remnants. The generator is visually reminiscent of her battery project, being of similarly enormous size and organized as a central tuberous body attached to a tangled mass of catwalks and hoses extending both far above and far below eye level. And, recalling the earlier point about the solanine content of potato sprouts, the neurotoxin generator can be seen as paralleling Chell’s potato by sending toxic compounds shooting through the far reaches of the facility. These parallels work to assert Chell’s own biological powers, establishing her superpotato as a mirroring of GLaDOS’ power and reach. Further, her decisive demolition of the generator validates the threat that she poses; it triggers the collapse of an entire wing of the facility while presumably her potato continues just where she left it, shooting up into the ceiling and overrunning the place in perpetuity. The PotatOS Science Kit offers a similar validation in its copackaging of Chell’s science fair poster with the tools for building a PotatOS rather than the potato battery featured in the game. It substitutes one powerful potato for another, the slippage suggesting that Chell’s mutant tuber equals or rivals the core of Aperture Science itself. The foreshadowing of her rebellion through the science fair project and the game’s establishment of her as a rival biological threat therefore combine in a validation of her actions, even as the game simultaneously projects the limitless power of the corporation gone awry.

Conclusion

For all her rebellious heroism, Chell cannot defeat Aperture Science. Even as the game continually celebrates her rugged individualism, and even as it draws parallels between her power and GLaDOS’, it also confines the scope of her victory to her own narrow escape. The game allows no toppling or reform of corporate power. Chell’s escape rather brings with it a decided strengthening of GLaDOS’ powers, as the human victimization that *Portal 2* critiques is left to continue unabated until the last test subject is expended. As a satire of agricultural industry, its bleak hopelessness as to the potential for change is scarcely relieved by the humor employed in the potato motif. But as a celebration of the value of ethical resistance it remains optimistic, redirecting its critical focus to emphasize individual action even in the face of overwhelming oppression. In demanding of the player a rule-breaking

performance and a suspicious intuition of its narratives, *Portal 2* requires an enactment of rebellious thinking that is supplemented by Chell's idealized physical and intellectual mutinies. It thus seeks to persuade not only of problems attending corporate culture but also of the value of recognizing and challenging them. Its answer to Aperture's monstrous power is a vision of principled resistance that functions at the scale of Chell's fight, as it might in players' more ordinary interactions with corporate agriculture: a vision in which free thought outlasts bodily captivity, action defies silencing, and a recognition of corporate rhetoric enables autonomy from it.

Acknowledgment

The author is grateful to Colin Milburn, Katie Leveling, and two anonymous reviewers for their thoughtful feedback on earlier drafts of this article.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Notes

1. There has been considerable scientific debate on potato phylogeny, but the crop is generally agreed to have originated in Central America before its domestication further south; see van den Berg and Jacobs (2007) and Spooner, McLean, Ramsay, Waugh, and Bryan (2005).
2. Borel (2014) places the Ice Minus incident within the larger history of GMO protests.
3. McHugh (2007) details the NewLeaf's reincarnation in Ozeki's novel.
4. In the agricultural sector, the player can also opt to raze the rainforest and nearby native settlements, despite consumer protests. In the feedlot sector, the player can elect to boost fodder with hormones, animal flour, or industrial waste, increasing yields but causing sickness in animals and consumers.
5. On paratexts: Jones (2008) and Consalvo (2007).
6. Salaman (1949, pp. 563–571) describes the rise of the potato processing industry as driven by the problematic accumulation of surplus. Talburt and Smith's (1967) massive reference text, *Potato Processing*, further details the scope of industry efforts to transform waste into useful products; of particular interest is the second edition's chapter on waste disposal.
7. The PotatOS Science Kit poster is not a literal recreation of the in-game original. It clarifies blurry segments and replaces some of the original drawings with the text-dense narrative segments from which my quotations are drawn.
8. Solanine causes hallucinations and other nervous system disorders, which Zuckerman (1998, p. 11) cites as driving the potato's frequent association with witchcraft in early

modern Europe. The neurotoxin has likewise inspired sensational stories such as *Smithsonian Magazine*'s article, "Horroric Tales of Potatoes That Caused Mass Sickness and Even Death" (Smith, 2013).

9. Gallagher and Greenblatt (2000, p. 111) note a similar conflation of human and plant bodies in the British potato debates of the 18th and 19th centuries, observing that the fecundity of peasants and of potato crops were often rhetorically linked such that "bushels of the staple food became almost interchangeable with people themselves," with "potato eaters often undergo[ing] a peculiarly quick transition from plant to person."
10. Schulzke (2013, p. 56) writes that despite Chell's escape, the game's "frequent warnings of long-term health consequences for using propulsion gel and other new technologies leave little doubt that she should expect to live with the physical and psychological consequences of the testing long after she has escaped the Aperture Science laboratories."
11. Milburn (2015, p. 62) likewise describes *Nano Breaker* as creating a realist critique, despite its fantasy, writing that while the military dimensions of the game "[resemble] the hyperbolic plots of superhero comics more than nuanced social critique, *Nano Breaker* nonetheless renders certain political conditions surrounding nanotechnology into playable format . . . [its] shocking irrationalism turns out to transcode an incisive social realism."
12. Burden and Gouglas (2012) interpret GLaDOS' rule as an enactment of the Milgram experiment; Schulzke (2013) suggests parallels to the Tuskegee syphilis experiment (p. 53).

References

- Behrsin, P. (2013, March 9). Data release: Failed CA Prop. 37 (GMO labeling)—Funding profile (\$55 M raised). *Maplight*. Retrieved from <http://maplight.org/data-release/data-release-failed-ca-prop-37-gmo-labeling-funding-profile-55m-raised>
- Bogost, I. (2007). *Persuasive games: The expressive power of videogames*. Cambridge, MA: MIT Press.
- Borel, B. (2014, May 20). The first GMO field tests. *Modern Farmer*. Retrieved from <http://modernfarmer.com/2014/05/even-first-gmo-field-tests-controversial-will-ever-end-fight/>
- Burden, M., & Gouglas, S. (2012). The algorithmic experience: Portal as art. *Game Studies*, 12. Retrieved from <http://gamestudies.org>
- Bradshaw, J. E. (2007). Potato-breeding strategy. In D. Vreugdenhil (Ed.), *Potato biology and biotechnology: Advances and perspectives* (pp. 157–178). Amsterdam, the Netherlands: Elsevier.
- Consalvo, M. (2007). *Cheating: Gaining advantage in videogames*. Cambridge, MA: MIT Press.
- Creager, A. N. H. (2002). *The life of a virus: Tobacco mosaic virus as an experimental model, 1930-1965*. Chicago, IL: University of Chicago Press.
- Franklin, S. (2007). *Dolly mixtures: The remaking of genealogy*. Durham, NC: Duke University Press.

- Gallagher, C., & Greenblatt, S. (2000). The potato in the materialist imagination. In *Practicing new historicism* (pp. 110–135). Chicago, IL: University of Chicago Press.
- Galloway, A. R. (2006). *Gaming: Essays on algorithmic culture*. Minneapolis, MN: University of Minnesota Press.
- Gamer_152. (2011). There's a hole in the sky [forum post]. *Giant Bomb*. Retrieved from <http://www.giantbomb.com/portal-2/3030-21662/forums/theres-a-hole-in-the-sky-492338/>
- Garrett, B. C. (1996). The Colorado potato beetle goes to war. *Chemical Weapons Convention Bulletin*, 33, 2–3.
- Haraway, D. (1997). *Modest_witness_@_second_millennium.femaleman[©] meets oncomouse[™]: Feminism and technoscience*. New York, NY: Routledge.
- Jones, S. E. (2008). *The meaning of video games: Gaming and textual strategies*. New York, NY: Routledge.
- Kohler, R. E. (1994). *Lords of the fly: Drosophila genetics and the experimental life*. Chicago, IL: The University of Chicago Press.
- Maugh, II, T. H. (1987, May 27). Plants used in UC's genetic engineering test uprooted. *Los Angeles Times*. Retrieved from http://articles.latimes.com/1987-05-27/news/mn-1767_1_plants
- McHugh, S. (2007). Flora, not fauna: GM culture and agriculture. *Literature and Medicine*, 26, 25–54. doi:10.1353/lm.2008.0010
- Milburn, C. (2015). *Mondo nano: Fun and games in the world of digital matter*. Durham, NC: Duke University Press.
- Millam, S. (2007). Developments in transgenic biology and the genetic engineering of useful traits. In D. Vreugdenhil (Ed.), *Potato biology and biotechnology: Advances and perspectives* (pp. 669–686). Amsterdam, the Netherlands: Elsevier.
- Molleindustria. (2006). *McDonald's Videogame* [online game]. Retrieved from <http://www.mcvideogame.com>
- Nestle, M. (2003). *Safe food: Bacteria, biotechnology, and bioterrorism*. Berkeley, CA: University of California Press.
- Nunn, N., & Qian, N. (2011). The potato's contribution to population and urbanization: Evidence from a historical experiment. *The Quarterly Journal of Economics*, 126, 593–650. doi:10.1093/qje/qjr009
- Pollan, M. (1998, October 25). Playing God in the garden. *The New York Times*. Retrieved from <http://www.nytimes.com/1998/10/25/magazine/playing-god-in-the-garden.html>
- Pieterse, L., & Judd, J. (2014). *World catalogue of potato varieties* (6th ed.). Christchurch, NZ: Agrimedia.
- Rader, K. (2004). *Making mice: Standardizing animals for American biomedical research, 1900-1955*. Princeton, NJ: Princeton University Press.
- Reader, J. (2008). *Potato: A history of the propitious esculent*. New Haven, CT: Yale University Press.
- Salaman, R. (1949). *The History and social influence of the potato*. Cambridge, MA: Cambridge University Press.

- Schulzke, M. (2013). The bioethics of digital dystopias. *International Journal of Technoethics*, 4, 46–57. doi:10.4018/jte.2013070104
- Smith, A. F. (2011). *Potato: A global history*. London, England: Reaktion Books.
- Smith, K. A. (2013). Horrific tales of potatoes that caused mass sickness and even death. *Smithsonian.com*. Retrieved from <http://www.smithsonianmag.com>
- Spooner, D. M., McLean, K., Ramsay, G., Waugh, R., & Bryan, G. J. (2005). A single domestication for potato based on multilocus amplified fragment length polymorphism genotyping. *PNAS*, 102, 14694–14699. doi:10.1073_pnas.0507400102
- Squier, S. M. (2011). *Poultry science, chicken culture: A partial alphabet*. New Brunswick, NJ: Rutgers University Press.
- Talbert, W. F., & Smith, O. (1967). *Potato processing* (2nd ed.). Westport, CT: Avi.
- Think Geek and Valve Corporation. (2011a). *PotatOS Science Kit*. Fairfax, VA: ThinkGeek.
- Think Geek and Valve Corporation. (2011b). *PotatOS Science Kit* [product description]. Retrieved from <https://www.amazon.com/Portal-PotatOS-Science-ThinkGeek/dp/B006P0ET1K/>
- Valve Corporation. (2011a). *Portal 2* [computer software]. Retrieved from <http://store.steampowered.com>
- Valve Corporation. (2011b). *Portal 2: Lab rat*. Retrieved from <http://www.thinkwithportals.com/comic>
- van den Berg, R. G., & Jacobs, M. M. J. (2007). Molecular taxonomy. In D. Vreugdenhil (Ed.), *Potato biology and biotechnology: Advances and perspectives* (pp. 55–76). Amsterdam, the Netherlands: Elsevier.
- VInethrel. (2015). GLaDOS has so much neurotoxin because of the potatoes [forum post]. *Fan Theories*. Retrieved from <https://www.reddit.com/r/FanTheories/comments/34inkw/>
- Wendler, Z. R. (2014). “Who am I?”: Rhetoric and narrative identity in the *Portal* series. *Games and Culture*, 9, 351–367. doi:10.1177/1555412014543517
- Zuckerman, L. (1998). *The potato: How the humble spud rescued the western world*. Boston, MA: Faber and Faber.

Author Biography

Melissa A. Wills is a PhD candidate in English at the University of California, Davis.