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# The New Mass Ornament: *World War Z*, Crowd Simulation, and Post-Fordism

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## ABSTRACT

The article investigates the representation of the zombie digital multitude in *World War Z* (2013) and its concurrent mode of production (MoP) as a dialectical pair for mutual illumination. In his now canonical essay “The Mass Ornament,” Siegfried Kracauer argues that the group dance of the Tiller Girls and the capitalist *Ratio* of its time can shed light upon each other. My article argues that Romero’s zombie horde is a dialectical reversal of the Tiller Girls and, hence, a negative mass ornament. While the zombie horde upholds an utterly visceral and chaotic collectivity, it shares similar symptoms of mechanization and dismemberment under the same Fordist MoP. Building on the idea of the zombie horde as a negative mass ornament, I argue that the zombie digital multitude in *World War Z* can be approached as a new mass ornament that is dialectically connected to the post-Fordist MoP, in which the production process is increasingly tied to network-like organization and globalized flexible specialization, undergirded by the digital infrastructure. Specifically, I will explore the post-Fordist ideals in the technical development of crowd simulation, the visual effects industry, and the network society, so as to understand both the zombie digital multitude and post-Fordism.

**KEYWORDS** zombie, Siegfried Kracauer, visual effects, labor, network society

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The new millennium's zombie cycle marks a proliferation of innovative zombie films and TV shows. Originally a hybrid of horror, disaster, and science fiction movies, as in George Romero's landmark trilogy of the Living Dead, recent zombie films have diversified into documentary, reality shows, comedy, or even romantic comedy. Notable zombie films include *28 Days Later* (2002), *Shaun of the Dead* (2004), *Land of the Dead* (2005), *28 Weeks Later* (2007), *Diary of the Dead* (2007), the *REC* series (2007, 2009, 2012, 2014), *Day of the Dead* (2008), *Zombieland* (2009), *Warm Body* (2013), *World War Z* (2013), and *Train to Busan* (2016); and TV series include *Dead Set* (2008), *The Walking Dead* (2010-), *In the Flesh* (2013-2014), *Z Nation* (2014-2018), *Santa Clarita Diet* (2017-2019), and *Kingdom* (2019-). While these works are still dominated by swarming scenes of gory zombie feasts and combats, a small number of them show zombies that are rehabilitable and can be reintegrated into human societies. In tandem with this newfound diversity within the zombie, zombie scholarship also flourishes. Subjects ranging from racism, imperialism, patriarchy and the nuclear family, disease and contagion, digital virus and the Trojan malware, consumerism, and crowd psychology, attest to the richness of the shambling, mindless monster figure.<sup>1</sup>

Also new to the zombie cinema since the start of the new millennium is the mutation of fast zombies delivered by the visual effects of computer-generated virtual crowds. Early virtual crowds in films were supplementary, often inserted to simply fill up empty spots in the background—for instance, as the warring armies or cheering crowds. But by developing what later became *MASSIVE*, the most popular crowd simulation software, the Weta studio created simulated fighting crowds that were intelligent enough to “see the battlefield around them . . . and react realistically. Different kinds of warriors could use different behaviors—so orcs fought differently from elves” (Weta 219). As crowd simulation takes off, crowd scenes begin to serve the main attraction and take on new meanings. Kristen Whissel identifies across many blockbusters films, including in *The Lord of the Rings* trilogy, a specific kind of simulated crowd with “surprisingly consistent set of formal compositions,” which she calls the “digital multitude” (60).<sup>2</sup> Rather than adding importance to the protagonist, the digital multitude

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<sup>1</sup> For example, the publishing house McFarland has published a book series titled “Contributions to Zombie Studies,” encompassing about twenty-nine books so far.

<sup>2</sup> Whissel's film survey includes *The Matrix* trilogy (1999, 2003), *Star Wars Episode II: Attack of the Clones* (2002), *The Lord of the Rings* trilogy (2001, 2002, 2003), *The Mummy* (1999), *Troy* (2004), and *300* (2006) (59). Note that although she underlines the pervasive tone of the apocalypse in the digital multi-

can be characterized as “massive in size,” “highly mobile,” and capable of “swift assault [which] enacts the notion of an impending apocalypse that threatens to overturn an era almost without warning” (Whissel 66). Exploring many of the digital multitude narrative functions in her survey, Whissel intimates that the popularity of the digital multitude reflects how the contemporary global audiences are negotiating with various impasses on many different levels, and that such popularity attests to a global call of collective action to “bring about sudden, broad-scale change” (88).

It is in the 2013 film *World War Z* (hereafter *WWZ*) that the zombie resurgence, cutting-edge crowd simulation, and the apocalyptic digital multitude converge in the most spectacular way. Based on the eponymous novel by Max Brooks (2006), *WWZ* tells the story of how Gerry Lane (Brad Pitt), a U.N. investigator, travels around the world to find a cure to stop the sudden worldwide zombie outbreaks. Starting his investigation in a U.S. military base in South Korea, Gerry follows a lead provided by a former CIA agent to Jerusalem, where high walls provide the final human stronghold against the undead. To Gerry’s great surprise, the city quickly falls upon his arrival. Tens of thousands of zombies overcome the walls and flood the entire city. At the last minute, Gerry boards a civil airplane and lands in a WHO facility in Cardiff, U.K. At the end of the film, the zombie pandemic is stopped with a camouflage vaccine and finally the world begins to see hope again.

Undoubtedly, the investigation setup of the film allows the audiences to witness firsthand the scale and gravity of the zombie apocalypse around the globe, which makes the film appear superficial and politically unambitious. *WWZ* foregrounds epic scenes of swarms of fast-running, aggressive, and resourceful zombies taking down humans and civilization. Scene after scene, the film presents masses of people and the undead running, quite indistinguishably, in the streets across major cities around the world. As such, *WWZ* features the most epic digital multitude thus far while appearing to be just another spectacle-driven blockbuster, albeit shot in a rather somber, documentary style.

In the canonical essay “The Mass Ornament” (1927), Siegfried Kracauer postulates that “knowledge of this state of things depends on the interpretation of these surface-level expressions. The fundamental substance of an epoch and its unheeded impulses illuminate each other reciprocally” (75). By the “surface-level expression” Kracauer means the Tiller Girls group dance, considered frivolous, light entertainment in the early decades of the twentieth century, whereas the

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tude, Whissel does not discuss any of the zombie blockbusters in her survey, probably because none of the zombie films featured mature crowd simulation at the time of her writing.

“fundamental substance of an epoch” refers to the *Ratio*, that is, instrumental reason or what Kracauer calls “murky reason” (81). Thus, at the beginning of the essay, Kracauer establishes a dialectical pair composed of “surface” and “substance,” and uses one to illuminate the other. In retrospect, the *Ratio* can be elucidated through an examination of the historical mode of production (MoP), namely, Fordism in its early stage. As Harry Braverman explains it, “the mode of production, the manner in which labor processes are organized and carried out, is the ‘product’ of the social relations we know as capitalist,” which is always part of the bigger historical processes in which the society participates (15). In other words, while the capitalist production relations continue to dictate the organizing of labor processes, the mode of production changes with time. To show the historical changes of the MoP in capitalism, this article will use Fordism (Fordist MoP) and post-Fordism (post-Fordist MoP) as two distinguishable periods. In essence, post-Fordism is only one of the theoretical constructs used to understand the changes since the mid-1970s as a specific phase of capitalist development.<sup>3</sup> It was a time of the inception of the international division of labor, burgeoning advances in electronics and computerization, labor unrest, and soon neoliberal policies and economic crises—all this increasingly led to the disintegrating of the vertically integrated, monolithic Fordist MoP (Harvey; Amin).<sup>4</sup>

While Kracauer demonstrates how the Tiller Girls and the Fordist *Ratio* can illuminate each other, it is George Romero’s living dead that help explicate Kracauer’s method by presenting a dialectical reversal of the Tiller Girls—as a negative mass ornament. With its utterly visceral and chaotic collectivity, the zombie horde nevertheless shares similar symptoms of mechanization and dismemberment under the same Fordist regime. I argue that the virtual zombie multitude in *World War Z* can be approached as a new mass ornament that is dialectically connected to the post-Fordist MoP, in which the production process is increasingly tied to network-like organization and globalized flexible specialization, undergirded by the digital infrastructure. Specifically, I will first explore the post-Fordist ideals in the technical development of crowd simulation, which provides concrete visual representation of a new collectivity. And then, I will explore how the characterization of the digital multitude and film narrative engage dialectically with the post-Fordist *Ratio*, which involves complex processes of globalization and digital mediation. In particular, I will read the film

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<sup>3</sup> Ash Amin notes that by the mid-1990s, “new epithets such as ‘post-Fordist,’ ‘post-industrial,’ ‘post-modern,’ ‘fifth Kondratiev,’ and ‘post-collective’ have been coined by the academic prophets of our times to describe the emerging new age of capitalism” (1).

<sup>4</sup> For more discussion on Fordism and post-Fordism, please see my article “*Monsters, Inc.*”

*WWZ* against Manuel Castells's popular theory of the network society, which upholds early post-Fordist ideals and paints an optimistic picture of the post-Fordist *Ratio*. In brief I argue that the superficial new mass ornament of the *WWZ* zombie multitude can be read as unique "unheeded impulses" that illuminate the "fundamental substance" of the post-Fordist MoP, while the post-Fordist MoP provides a critical lens to examine the representation of the simulated undead. By taking the zombie digital multitude as a new mass ornament, we may see what Whissel's digital multitude's call to immediate collective action can be inferred from the zombie digital multitude.

### **Fordism, the Mass Ornament, and the Zombie**

To some critics, the close link between the mass ornament and mass production is too self-explanatory to be useful. Henrik Reeh has expressed his "reservations" about whether "the mass ornament is a simple analogy between production and entertainment" (95). With regard to the case of the Tiller Girls, such reservations are not unfounded. The mass ornament, or the Tiller Girls, was an aestheticized form of mechanized production that originated in a Manchester factory in 1889. Graeme Gilloch notes: "the Tiller Girls were initially recruited from young women working in the factories and mills of north-west England—ironically, then, drawn from the very mechanized production lines that their dance routines so resembled" (65). The Tiller Girls "were trained to perform specially choreographed and synchronized 'tap and kick' dance numbers" and were famous for their high-kick routines (65).

Meanwhile in the U.S., the epicenter of Fordism, there existed a surfeit of such women dance troupes and film musicals, with the Ziegfeld Girls and Busby Berkeley's film musicals being the most successful. Joel Dinerstein calls this kind of dance performance "mechanized choreography" in both the European and American contexts from the 1910s to 1930s (197). Among the American dance groups, Dinerstein identifies the Rockettes who institutionalized "the precision chorus line" in the 1930s that "offered neither individuality nor improvisation, but instead a dance machine made out of human female cogs" (197). Although these women dance troupes were all very well received, not every critic found them to be enjoyable. Gilbert W. Gabriel, a *Vanity Fair* critic, found the movements of chorus lines "joyless" and "associated their coldness with overmechanization: their intensity, their group discipline, their unison kicks, 'their torsos with . . . clock-like communality of spasm, their heads and arms with such a crack infantry precision'" (qtd. in Dinerstein 196).

Nevertheless, Kracauer does not dwell upon the dehumanizing disfiguration of the dance routine, but strives to illustrate how the *Ratio* of capitalism is expressed through its mode of production or, more historically specifically, through the Fordist MoP. As Kracauer contends, “The mass ornament is the aesthetic reflex of the rationality to which the prevailing economic system aspires (78-79). In fact, the Tiller Girls are by no means entertainment disguised in mass production, but rather a kind of public education or mass mobilization for the Fordist MoP. As Kracauer maintains, “the girl-units drill in order to produce an immense number of parallel lines, the goal being to train the broadest mass of people in order to create a pattern of undreamed-of dimensions” (77). In order to define the mass ornament, Kracauer evokes three common group formations that also exhibit ornamental functions, namely, military exercise, ballet, and gymnastics. Respectively, all three formations seek to elicit certain feelings in the spectators—patriotic, erotic, and decorative, but the mass ornament is void of content and “needs to be understood *ratio-nally*” (77). As Kracauer explains,

[T]he *Ratio* of the capitalist economic system is not reason itself but a murky reason. Once past a certain point, it abandons the truth in which it participates. *It does not encompass man.* The operation of the production process is not regulated according to man’s needs, and man does not serve as the foundation for the structure of the socioeconomic organization. (81)

That is, central to the aesthetic reflex is the inorganic aspect of the Fordist rationality, which demands human adjustments to suit its own needs. “Since the principle of the *capitalist production process* does not rise purely out of nature, it must destroy the natural organism that it regards either as means or as resistance,” Kracauer postulates (78). It is in the paradoxical phenomenon of the “sexless bodies in bathing suits” of the Tiller Girls that the subjection of the eroticized bodies to the abstract patterns they form is most blatant.<sup>5</sup> Thus, the legs and hands, as fetishized in the Tiller’s Girls dance, resonate with the mass spectators whose body is subsumed under the same Fordist regime.

Moreover, the inorganic subjection of the division of labor also molds the Fordist production relations. That is, the fragmentation of the labor process not only dissects the body of the workers (“The mass gymnastics are never performed

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<sup>5</sup> To infer from Dinnerstein’s argument, the appearance of “sexless” female bodies had to do with white men’s repression. It was often the color women in the dance troupe that were tasked with delivering the more emotionally-charged and dramatic performance, while the white women dancers remained “neutral” and “rational” (Dinnerstein 197).

by the fully preserved bodies”), but also aspires to rationalize social relations from the organic “people” to “the mass” (76). As Kracauer ruminates, “The structure of the mass ornament reflects that of the entire contemporary situation”; “The bearer of the ornaments is the *mass* and not the people [*Volks*]” (78, 76). Mostly, it was through disciplinary and militaristic measures that the inorganic composition was achieved. As Dinerstein astutely observes, “Ziegfeld’s chorines also had to demonstrate the self-discipline their standardized roles suggested. As with the invasive surveillance of workers perpetrated by Ford’s sociological department, Ziegfeld practiced paternalistic discipline, and it was part of his industrial appeal” (200). And the massification process does not stop at national boundaries for the recruitment of labor. As Kracauer points out, “A system oblivious to differences in form leads on its own to the blurring of national characteristics and to the production of worker masses that can be employed equally well at any point on the globe” (78). As such, labor rationalization constitutes the basis of the capitalist society and reverberates through the whole enterprise of production and accumulation around the world. But, of course, at this point capital was not yet as universalized; it had to wait until the post-Fordist international division of labor to really incorporate the global masses of worker into the capitalist production system.

Here, one might ask if the Romero zombie crowd, which emerged near the decline of Fordism, could also be considered a mass ornament. And how do we take the fast and resourceful *WWZ* simulated zombies as a new mass ornament and what kind of insight can we gain from this perspective? First, it is important to distinguish the Romero zombies from the virtual zombies in *WWZ*. It is not only because the Romero zombies are slow and played by human extras while the simulated zombies are fast and virtual, but also because they belong to different MoPs. More crucial to the question of the MoP is the deep connection between zombies and labor.

Already implicit in *White Zombie* (1932), the first American zombie film, the zombie is characterized as a slave and machine appendage. Loosely based on William Seabrook’s travelogue, *The Magic Island* (1929), *White Zombie* characterizes the Haitian zombie as a victim of the voodoo witch doctor, revived from death only to do the bidding of the master. While the story and setting of *White Zombie* evoke Caribbean slavery and colonialism, the Halperin brothers (producer and director) frame the film as a European Gothic horror, probably for practical reasons. They appropriate Bela Lugosi’s screen persona of the Horror vampire and repurpose the dark castle and dungeon-like sugar factory (Rhodes 48, 98). While studies on *White Zombie* are rich with issues of imperialism, colonialism, and racism (Phillips), the film itself focuses on work processes—either the

witchcraft practices or the sugar mill operations. The true highlight of the film is the elaborate operations of the zombification magic by the voodoo master “Murder” Legendre (Lugosi), encompassing extensive shots in detail of how Legendre zombifies healthy people into death and then steals their corpses for capital exploitation and domination. With the zombie magic, Legendre fills his sugar mill with an army of zombie workers and always surrounds himself with an entourage of henchmen, turned from former enemies, including Haitian ex-Minister of the Interior, a captain of the gendarmerie, and the high executioner. In that sense, the voodoo master is as much a capitalist as what Karl Marx calls a vampire as a metaphor. Chained to the grind, the zombie slaves are working day and night at the sugar mill only to enrich the mill owner. In one memorable scene, one zombie collapses and falls into the grinder, without eliciting the slightest scream for help, let alone any commotion. Presumably, despite the exotic setting, for the American audiences in the early 1930s, the monotonous rhythm of the mill and the primacy of production exemplified a negative projection of the Fordist MoP, in which the ever-running conveyor belt was similarly ruthless and exhausting in the social imaginary.

But it is not until George Romero that the Haitian zombie becomes a monster native to the American psyche. Generally, the zombie is known to be a slave, and its undeadness represents a critique against capitalist labor exploitation. Steven Shaviro has perceptively noted how the Romero zombie not only rebels against capitalist appropriation but also engages with its logic: “Romero’s zombies have none of the old precapitalist sublimity, but they also cannot be controlled and put to work. They mark the rebellion of death against its capitalist appropriation. . . . They come after, and in response to, the capitalist logic of production and transformation” (83-84). More radically, David McNally in his important book *Monsters of the Market: Zombies, Vampires and Global Capitalism* (2011) argues against critics who tend to take Marx’s uses of monsters as metaphors or superfluous ornaments. As McNally contends, “Far from textual adornment, Marx’s literary stylistics and empirical analyses—the very places where we most often encounter monsters—are integral elements of his conceptual schema” (116).

More importantly, McNally argues that the lesson of the disenchantment of capitalism works through a dialectical reversal: “Because capitalism constitutes an alienated, topsy-turvy world, one in which phenomena regularly appear upside-down, the theoretical discourse that maps it needs to mimic the wild movement of things so as to better expose it” (280). This method of dialectical reversal is key to the understanding of zombies because it explains why zombies have such a complicated relationship with labor. First, zombies’ obsession with production is

legendary. Laying waste to the workplace, with the least care about wages and survival, zombies nevertheless come back to spread the disease and to produce more labor. As Gregory Walker wryly remarks, “The living dead do not require satanic cunning or superhuman strength to achieve their ends, and their simulacrum of immortality holds no promise of pleasure or privilege, just work and more work” (280).

Similarly, under close examination, it is clear how the zombie body and mannerism mimic the machine and division of labor in the factory or the office. Arguably, the productive mechanizations have been so traumatizing that the stress is permanently sealed in the zombified state, impervious to pain or abuse. Stupid and slow, the zombie also embodies the deprivation of intellect in the labor process. As Braverman points out, the Taylorist division of labor consists in the fact that “[e]very step in the labor process is divorced, so far as possible, from special knowledge and training and reduced to simple labor” (18), so that workers are deskilled, docile, and passive, and will carry out whatever tasks they are assigned and nothing more (77-82). Accordingly, the Tiller Girls dance routine is not so different from the zombie body politics. As Kracauer writes, “Their mass gymnastics are never performed by the fully preserved bodies, whose contortions defy rational understanding. Arms, thighs, and other segments are the smallest component parts of the composition” (77). But by turning the machine appendage state to the zombified state, the body is restored to the only organic state that is anathema to capitalist productivity. The zombie horde is therefore the negative mass ornament, which, instead of aspiring to the capitalist rationality, negates it.

If the zombies in *White Zombie* illustrate the Fordist labor exploitation wrapped in a mythical and exotic setting, the zombie horde in Romero’s *Night of the Living Dead* (1968) is a direct revolt against the Fordist MoP. As opposed to the geometric, rationalistic, and inorganic Tiller Girls, the swarming zombie horde is mythic, anarchistic, and organic, driven by the primal desire of hunger and the need to produce. In short, if the Romero zombie multitude embodies the dialectical reversal of the highly disciplinary and militaristic system of mass production, then it presents to us the negative mass ornament under Fordism. With a dialectical reversal, the Romero zombie multitude turns the Fordist MoP inside out and thereby heralds the end of Fordism.

## **Post-Fordism and Crowd Simulation**

As mentioned earlier, Braverman holds the mode of production to be the product of capitalist social relations, which dictate “the manner in which labor processes

are organized and carried out” (15). In fact, labor processes are constantly revised and shifting. As Marx contends, the capitalist class cannot survive without constantly revolutionizing the productive forces and hence the constant revisioning of labor processes, which in turn fuels new developments in class struggle. In post-Fordism, labor processes have increasingly become organized and carried out through the development of digital technology and network connectivity, which provide the basic conditioning of work and social relations under post-Fordism. It is the aim of the latter half of this article to demonstrate how the zombies in *WWZ* can be read as grappling with the new contradictions and possibilities embroiled in the new productive forces under post-Fordism, namely, with the *Ratio* of post-Fordism.

As digital mediation has increasingly come to shape the productive forces in post-Fordism, social relations have also come to revolve around network connectivity. In this regard, Castells’s theory of the network society has been considered quite influential, which optimistically projects a more equal and creative condition of work under post-Fordism. However, as we shall see, Castells’s theory of the network society has lent itself to neoliberalism in the form of government policies and mainstream ideology that further skew class power relations. As I will argue, such an imbalance of class power through digital mediation and globalization not only underlines many of the contradictions of the zombie characterization and the film narrative, but also accounts for the plights of the visual effects (VFX) industry at a global level. Still, as monsters of labor, the zombies in *WWZ*, like the Romero zombies, offer a timely critique of labor under the regime of post-Fordist digital mediation. In order to understand the dialectics of labor manifest in the *WWZ* zombies, I will begin with an account of the early post-Fordist ideals inherent in the emergence of crowd simulation as a mode of visual representation. Then, I will explore how the characterization of the *WWZ* zombies, as well as the human survivor narrative, can be read as complementary to the actual labor conditions of the VFX artists/technicians, which revolve around questions of digital mediation, globalization, and the network society.

As an effort to periodize capitalism, as Amin points out, the idea of post-Fordism is itself highly controversial and its meaning and implications remain open (3). Since this article attempts to propose a production-based framework, I will focus first on the shifts in post-Fordist production and then on its ramifications in social relations. In the three approaches to post-Fordism that Amin identifies—French regulation, flexible specialization, and neo-Schumpeterian, the flexible specialization approach advanced by Michael Piore and Charles Sabel is the most production-oriented (6). And indeed as A. J. Phillimore points out, production is “crucial to Piore and Sabel’s thesis, for their basic starting point is that changes at

the level of production are the primary determinants of the current economic crisis at all levels” (80). That is, Piore and Sabel maintain that the industrial shift to post-Fordism was driven by the crisis in the accumulation regime of the Fordist MoP, and the answer was a reform of production.

In light of such an economic crisis, what used to be a necessary evil no longer seemed tolerable. Since its birth in the early twentieth century, Fordism has been notorious for its rigidity, ruthless standardization, labor alienation, and the deprivation of intellectual thinking—despite all its efficiency and capacity to mass produce affordable commodities. As a revision, post-Fordism appeals to flexibility against rigidity (just-in-time production, flexible hiring, outsourcing, subcontracting), individualism against conformism (skilled vs. deskilling, customization vs. mass production), and equalitarian against authoritarian (flat organization vs. hierarchy, networking vs. centralization), etc. As we shall see, such a shift in the MoP has more to do with the changes in capital’s mode of surplus exploitation, in relation to advances in the productive forces of new technologies and knowledge, than with a well-intentioned respect for labor.

The flexible specialization approach first appeared in the widely popular book *The Second Industrial Divide* (1984) by Piore and Sabel. They argue that flexible specialization as shown in crafts, skilled-based, small batches production has always been a paradigm parallel to the Fordist mass production system (21). In their opinion, the extolling of mass production and the suppression of flexible specialization were political rather than fulfilling the “logic of industrial efficiency” (6). They are optimistic that with the decline of Fordism, flexible specialization can redeem craftsmanship and counterbalance the state-sponsored Fordism. Flexible specialization also promotes an alternative production relation characterized by trust, peer-sharing, small units, and network-like organizing of labor, as a corrective to the hierarchical, centralizing, and rigid production relations in Fordism (32). They go on to point out:

Under these circumstances, . . . business dealings were by parole contract, and . . . *intuitus personae*—judgement, acquired by long experience, about the character of potential partners—was seen as a prerequisite to success. The constant reorganization of production was possible only on the condition that everyone knew, and was known to abide by, a long list of rules of fair behavior. . . . (32)

In other words, the production relations in flexible specialization will be the complete opposite to those in Fordism, which has long stifled personal judge-

ment and genuine collaboration with a top-down approach to the organizing of labor processes. In lieu of the Fordist assembly-line mechanization, as Piore and Sable uphold optimistically, flexible specialization engages production through spontaneous networks of equalitarian peers who work with respect to individual knowledge and craft.

As if reflecting the post-Fordist ideals, Craig Reynolds conceives of a technical solution to the problem of representing a more organic collectivity that redeems individual flexibility and judgement. In Reynolds's groundbreaking article, "Flocks, Herds, and Schools: A Distributed Behavioral Model" (1987), the technical breakthrough of crowd simulation is portrayed as aiming to simulate autonomous members that naturally act differently but toward the same goal as a group. The core technology of crowd simulation embraces the post-Fordist ideals as it attempts to recreate the movement of masses of people as can be observed in physical reality, as opposed to the mass ornament, composed of identical members in contrived identical movement.

As Reynolds contemplates, the "aggregate motion of a flock of birds, a herd of land animals, or a school of fish" is a beautiful wonder of nature, and yet crowd movement is extremely difficult if animated manually (25). To achieve flock simulation, Reynolds borrows from William Reeves's particle system, which has been created to simulate "fuzzy objects" like water, smoke, and fire. Reeves understands that the difficulty of fuzzy object simulation consists in the lack of definite boundaries. The solution Reeves proposes is the particle system—a system that can provide global control over the aggregate motion composed of the "life cycle" of each individual particle which generates, lives, and dies independently (92). It remains for the particle system to randomly select and control fuzzy objects ("controlled stochastic processes") so that living fuzzy objects can naturally emerge (93). With the realization of the similarity between fuzzy objects and crowds, Reynolds adapts the particle system into a crowd simulation system by replacing individual particles with individual animals (such as a bird or fish), which he calls the "boid" ("bird-oid object"). Later as the field develops, the boid is known as an "agent" in computer terminology, and the approach Reynolds pioneers is referred to as agent-based.

Whereas the particle lives precariously through its life cycle, Reynolds' boid is endowed with certain "intelligence" to engage in the flock activity. Reynolds stipulates three principles for the action of the boid: matching speed, flying toward the center, and collision avoidance, among which the last becomes the most important. It appears that agents can "communicate" with each other through carefully designed collision avoidance. As Reynolds's agent-based approach

develops, the agent has become more intelligent. To control the agent's behavior more efficiently, computer scientists later use the Finite-State Machine (FSM), a name first proposed by David Zeltzer to "control the synthesized human gait" (Thalman and Musse 82). The FSM is crucial to agent-based simulation, serving as a relay between intentions and actions by triggering transitions between a finite set of "states" (movement, such as walking, running, falling, etc.). In *WWZ*, the technicians develop a sophisticated FSM to simulate a specific rag-doll behaviorism, which makes the zombies act very distinctively from conventional zombies—a point I will address soon.

Moreover, the agent's behavior ("state") is basically a recreation from motion capture, that is, from the recorded live movement for digital manipulation. The data from the motion capture is then chopped up as different sets of movement such as walking or running to construct the "locomotion engine," which drives the action of each agent with random differences. Interestingly, the recreation of movement from motion capture and locomotion engine means the awkward shambling of the zombies is actually a faithful representation of the chopped-up movement before they are seamlessly reconstructed into crowd simulation. It is uncanny that the hands and legs of the mass ornament are preserved in plain disguise through the new mass ornament of the zombie digital multitude. This indicates how, as much as digital technology fuels a fantasy of labor-free automation, work can remain painfully labor-intensive. When Reynolds developed crowd simulation, his dream was to achieve full automation of animation production with computer programming (27). And yet, while the animator or the computer programmer does not have to animate crowd simulation manually, it is still far from hassle-free automation; rather, it is a hybrid of the most advanced simulation technology and intensive labor. As Stephen Holmes reports, "There are hundreds of people at Cinesite and MPC [Moving Picture Company] who have spent two years of blood, sweat and tears trying to get this movie to the screen!"<sup>6</sup>

Believable and realistic as it is, agent-based simulation is still too unwieldy for real-time simulation for wider applications, such as video games, VR, or public safety. Roger Hughes, a civil engineer, proposes an alternative continuum model, based on fluid dynamics, to simulate more efficiently the flow of pedestrians in big cities or public transportations. As other researchers comment, the continuum approach can "integrate local collision avoidance and global planning in one simulation framework" and can "exhibit smoother motion than agent-based methods,"

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<sup>6</sup> The visual effects works of *WWZ* are outsourced to different effects studios, of which Cinesite and MPC are the two biggest. I will address this point later.

having thus “higher efficiency” (Mao et al. 231). In their book *Crowd Simulation*, Daniel Thalmann and Soraia Raupp Musse see the agent-based approach as foundational to the “behavioral models,” which aim for more realistic actions, while the continuum approach, or the “force-field model,” fashions crowd movement from the external environment (Thalmann and Musse 12). They point out that the behavioral models are ideal for “individualized specification of agents” whereas force-field models excel in “global crowd control in high-density situations” (12). It is worth noting that even though realistic actions generally come before computational costs for crowd simulation in films, both agent-based and continuum approaches are adopted in *WWZ* to create the seas of zombies. As Ian Failes notes, “MPC utilized a rig which was essentially a 3D volume that could be controlled and allowed for the placement of crowd agents as a first blocking pass.”

However, even though crowd simulation can globally control the individual agent, it remains a challenge to create enough sets of actions and wardrobes for each agent. For *WWZ*, the MPC “modelling and texture artists in the asset team created 24 different body types, men women and children, varied with textures and multiple clothing options,” and “by the end, they established their system to include 3,000 different agents, none of which were the same” (Hurst). And the 3,000 agents will provide the basis for even more variation for ten or twenty thousands of zombies, while the “over 3,000 different wardrobe outfits that could be mixed and matched were created for the zombies” (Failes). In brief, the core idea of successful crowd simulation is achieved by creating autonomous agents, customized mass production, and decentralized collaboration, which are the hallmarks of post-Fordism. But more relevant to the discussion here is the appearance of a spontaneous collectivity emerging from the new labor processes, which heralds the so-called network connectivity based on digital mediation unfolding onto the world stage. And the simulated zombie crowd in *WWZ* addresses specifically this point with its unique characterization.

### **The *WWZ* Zombies and Digital Mediation**

As a monster of labor, the zombie has demonstrated again and again the historical struggle against various MoPs. From Haitian slavery to Fordism, the zombie has dialectically engaged with “the way in which labor processes are organized and carried out” (Braverman 15). The *WWZ* zombie carries on with similar struggles, but because digital mediation is so complex, the simulated zombie now exemplifies even more sophistication and hybridity. This point is revealed to us through the

very paradox of the zombie. The zombie is generally understood to collapse the binary between life and death (Shaviro), between subject and object (Lauro and Embry), or between consumption and production, but *WWZ* further exploits the dialectical reversals of the zombie and presents more binary collapsing, and in so doing the film inadvertently reveals to us the contradictions of the more recent development in capitalism. Specifically, the characterization of the zombie and the film narrative underline important issues regarding digital mediation and globalization—the two central processes in post-Fordism, accelerated and intensified since the mid-1990s.

Firstly, the *WWZ* zombie is characterized as both limp and superhuman. The limp effect is technologically innovative, driven by an FSM called the “rag-doll rig.” According to the MPC visual effects supervisor Jessica Norman, the rag-doll system allows “a partial rag-doll on an agent”: “You could have a clip running of the whole guy, but just part of the body like an arm would be a rag-doll. So if one of the agents ran into a wall he would react to that wall partially as a rag-doll. We also made it so you can go from clip to rag-doll to recovery” (qtd. in Failes). Norman is referring to the climactic scene of zombies overcoming the walls in Jerusalem. Thanks to the rag-doll rig, the zombies can use each other as ladders and plunge themselves off the precipitous walls, and after pounding into the ground or car roofs from extreme heights they shift quickly from the flat-corpse state to the up-and-running state. In this way, the *WWZ* zombie is actually turning disability into amazing adaptability.

Strangely, when running, the disabled zombies in *WWZ* are extremely fast, and the film pushes the speed further into the superhuman. The most astounding feat of the zombie multitude is the constant interaction with flying vehicles, which are invested with privilege and power in the film. When major cities are desperately mired in zombie outbreaks, Thierry Umutoni (Fana Mokoena), the U.N. Deputy Secretary-General, calls Gerry from a helicopter to make an extraction arrangement for him and his family. Looking down at the chaos and destruction, the shots from Thierry’s helicopter suggest that the airborne position is the only way to stay afloat the catastrophe. But unlike the traditional zombie hordes or the zombie digital multitudes, who tend to dominate the horizon, the zombies in *WWZ* are borderline airborne. As the film progresses, the zombies come closer and closer to taking control of the flying vehicles. Early in the film when Gerry co-pilots a military aircraft to leave South Korea, the zombies almost make passengers in the take-off. Approaching the last quarter of the film, the zombies finally take total control of the airplane. On the civil airliner bound for the WHO facility in Cardiff, passengers are zombified *en masse*, and Gerry is forced to blow

them out with a grenade and make the plane crash-land. More directly involved with the zombie struggle is the helicopter. When Gerry and his family first get picked up by the helicopter, the zombies fearlessly jump off the roof to reach the leaving helicopter but fail. Toward the end of the film, the helicopter sent to extract Gerry and his Israeli bodyguard Segen is seized by a small group of zombies and crashes. The eventual helicopter crash mirrors that of the airplane, suggesting the fatal ascendance of the zombies.

Furthermore, flying vehicles and skydiving zombies form a vertical axis in the film, which is a distinctive CG aesthetic identified by Whissel as the “spatialization of power” (26). Whissel proposes that the “digitally enhanced verticality as a mode of cinematic representation designed to exploit to an unprecedented degree the visual pleasures of power and powerlessness” (23). But besides being pleasurable, the verticality also glorifies the fearless zombies as it “gives dynamic, hyperkinetic expression to power” (26). Moreover, the already vertically empowered zombies in *WWZ* are further enhanced by the zombie tsunami scenes in the Jerusalem streets. The zombie multitude runs toward a school bus and topples it like sea waves and continues to flood the city far and wide. Here, the continuum-based crowd simulation achieves unprecedented horizontality that complements the verticality of the zombie multitude. As such, the *WWZ* digital multitude is even more “massive in size,” “mobile,” and capable of “swift assault” than the earlier digital multitudes discussed in Whissel’s work (59).

On closer look, the paradox of the limp-superhuman actually points to the underlying commonality of digital technology. While the rag-doll rig mimics the ease of media convertibility, the superhuman reflects specific CG aesthetics—both are endogenous to the digital. The *WWZ* zombies’ celebration of digital media contradicts Allan Cameron’s argument that “the zombie bodies are best rendered via the visual and tactile materiality of analog media” as Cameron argues that this “apparent insistence on analog embodiment indirectly recalls, in turn, arguments within film and media theory associating digital media with dematerialization” (85). It is true that unlike the traditional visceral, “all-body” zombies, the *WWZ* zombies are surprisingly immaterial, especially when they are massacred *en mass*. Their virtuality is highlighted in the scene of the fallen Jerusalem where zombies are slaughtered like worthless piles of flies but to little effect. Nevertheless, the *WWZ* zombies do not evoke any nostalgia for analogue embodiment precisely because they epitomize the embrace of digital mediality. In fact, digital dematerialization still confirms Cameron’s general thesis that the zombie body is a medium for information storage and sharing. That is, the digital zombie *is* the materialization of the invisible digital mediation processes. This point is all the more obvious

in *WWZ*: instead of being the generic blood-thirsty, cannibalistic monsters, the *WWZ* zombies only seek to transmit the virus with bites that leave a mark. No blood is shed and no flesh is torn in the film. While the change can be read as representing our cultural compulsion to share information in the age of Web 2.0, it also sheds light on a changing body politics. Just as labor processes become more digitized, so do the zombie bodies, which underline the shifting mode of labor exploitation from labor fragmentation to knowledge economy which claims to respect the worker's skills and judgement.

The other binary *WWZ* presents involves the contagion narrative and globalization. On a positive note, the film strives to present a "We Are the World" vision amidst the catastrophe of a global pandemic. In a quite moving speech to Gerry, the Mossad director explains that the reason why Israel welcomes refugees from other countries is because "Every human being we save is one less zombie to fight." A positive internationalism is also reinforced in the final sequence of the film, when tens of thousands of vaccines reach all corners of the world by drones. Meanwhile, the contagion narrative employs a rather common opening sequence of TV world news reporting the looming doomsday, with the rapid unfolding of unstoppable zombie outbreaks. Globalization is thus condemned as a massive, fatal blow to the human race as a whole. Here, we are presented with another collapse between contagion and globalization.

In short, the mixed messages expressed through the zombie characterization are in fact quite common to the post-Fordist world we now live in. In the following section, I will examine Castells's network society theory, which attempts to account for the complexity of post-Fordism. My aim is to demonstrate how the *WWZ* zombies and the VFX industry as an emblematic case of this theory in practice come to grapple with the post-Fordist *Ratio* championed by the network society.

### **Digital Zombies, the VFX Industry, and the Network Society**

Certainly, the binary-collapsing of the *WWZ* zombies is indicative of the contradictions of the latest stage of capitalism marked as post-Fordism, which is driven by the international division of labor and undergirded by the digital infrastructure. According to Stephanie Boluk and Wylie Lenz, the zombie virus is endemic in global capitalism. In exploring the relationship between the plague narrative and the development from mercantilism to postmodern capitalism, Boluk and Lenz conclude that the zombie virus "is a product of a world that has become increasingly governed by the logic of the network present in the rhetoric of globalization, social networking, and viral media" (145). Regarding the logic of the network, it

is Castells's popular theory of the network society that really attempts to account for all these complex social and technological processes. In what follows, I will use the post-Fordist media industry, in particular the VFX industry, as the emblematic case of the network society theory, and explore how the new MoP of the media industry can illuminate both the limp-superhuman zombies and the doomed-glorified globalization narrative, and vice versa. I will begin with an investigation of the post-Fordist debates that have been incorporated in Castells's network society theory, especially the strand of flexible specialization, and examine how Susan Christopherson's highly-regarded research in this area provides a counter-argument to the optimism of flexible specialization and the network society.

Informed by Piore and Sabel's flexible specialization, Castells confirms the decline of mass production with the rise of the network society, contending that "the work process is increasingly individualized," which will be "ushering in a new division of labor based on the attributes/capacities of each worker rather than on the organization of the task" (*Rise* 502). Similarly inspired by the idea of network collaboration in flexible specialization, but more technologically-minded, Castell's network theory holds that firms, cities, and individuals will become independent "nodes" or "hubs" and form various specialized networks in which nodes will compete to receive more "weight" because the most important resource in a network society is the access or connectivity to the network (*Rise* 443-45; "Informationalism" 42).

In fact, the post-Fordist transition to the so-called "new division of labor" began to intensify in Hollywood in the 1970s when the actual production of film was outsourced to networks of specialized firms. Following Sable and Piore, Susan Christopherson and Michael Storper argue that "[t]hese vertically disintegrated industries have been dubbed 'flexibly specialized' because individual firms are specialized but the complex as a whole is flexible" (331). Nevertheless, Christopherson and Storper contend that flexible specialization "result[s] in increased conflict among segments of the work force and a strengthening of employers' bargaining power vis-à-vis industry unions" (331). This is because in the outsourcing process, production companies "reduce their overhead by tailoring costs directly to the fluctuating quantity and nature of output—for example, by hiring labor on short-term contracts. These contractual relationships transmit the uncertainty employers face down the hierarchy of control to secondary subcontractors and, ultimately, to individual workers" (Christopherson and Storper 334). As a result, while specialized networks of media production and individualized labor have granted more autonomy and flexibility in work, it also has become more risky and exploitative for the individual worker in the film industry.

Among the specialized networks surrounding Hollywood, the relatively recent VFX industry has since the 1990s been one of the most vulnerable due to such arrangement. After receiving the Oscar award for best visual effects with *Life of Pi* (2013), Rhythm & Hues filed for bankruptcy, and the news media began to bring to light the plights of the industry. According to the documentary film *Rhythm & Hues: Life after Pi* (2014), between 2003 and 2013, twenty-one effects houses closed or filed for bankruptcy. *Life after Pi* attributes the main reason to the business model of “fixed bid” that the Hollywood conglomerates, as the only buyers of expensive visual effects, forced upon the effects studios, resulting in millions of unpaid overtime for the employees. But on a deeper level than the unfair deal-making, Christopherson argues that the creation of this production environment is facilitated by the pervasive espousal of the network society theory. As Christopherson points out, Hollywood media conglomerates have taken advantage of “an ideology of endogenous regional growth” (namely, to become the competitive “node” or “hub”) and “changes in national regulatory regimes governing competition” (namely, neoliberal deregulation) to shape a favorable global workforce that is both low in cost and constant in supply (740). According to such a school of thought, a region or city must step up to offer the media industry some kind of tax breaks or other incentive packages to attract more business opportunity and become more competitive globally, which Christopherson suspects is undermining the local economy in the long run (740).

In the aftermath of bankruptcy, the VFX industry began to reconsolidate into bigger multinational companies to take advantage of the same global workforce structure, and the production history of *WWZ* is no exception. There are five known studios responsible for different lines of work for *WWZ*, including Cinesite and MPC for the major zombie effect works, 2h3D and 4DMax for scanning, 3D data capture, and modelling, and Prime Focus for stereo conversion (Failes). Among the studios, MPC and Cinesite are two of the major players in the industry, themselves multinational corporations with branches in global metropolises including London, New York, Montreal, Vancouver, Paris, L.A., and Shanghai. Despite the seemingly stabilized structure after the reconsolidation, the VFX industry still operates as a global network that exploits geopolitical flexibility. Chasing after government incentives, the studios force the visual effects professionals to move from city to city, away from their families. As the effects artists in *Life after Pi* reveal, the “pixel gypsy” situation sums up the lonely life of digital overwork with little pay—a condition they endure out of deep passions for creative jobs.

So how does the effects industry shed light on the *WWZ* zombies? First, while the globalized network organization and individualized labor seem a welcome

remedy from Fordism, the MoP of the media industry itself explains the contradictions of the limp-superhuman zombie representation and globalization-doomsday narrative. In essence, they are about how the most fulfilling line of work is being distorted into the full degradation of work on a global scale. Again, the characterization of the zombie is illuminating. The *WWZ* zombie virus is much more aggressive as the appropriation of the body extends to the dormant state, which counts as yet another innovation of *WWZ*. The Romero zombies are known to be literally dormant when no prey is around for a long time. They can sleepwalk aimlessly out of their old habit (inside the mall, as in Romero's *Day of the Dead*), but when they rest, they remain in stasis like a corpse until new stimulation appears. But for *WWZ*, the animators model a distinct dormant state based on experimental dancers. As Matt Johnson, the VFX Supervisor at Cinesite, points out, "The animation team tried to move away from the classic zombie movement and employed experimental dancers to study a new style. The people we had in were in West End shows, in professional theatrical touring companies" (qtd. in Failes). The result is the most workaholic zombies ever. Constantly twitching involuntarily to shake off the stricture of the body frame (such as the zombie scientists trapped in the B wing of the WHO building), the dormant zombies in *WWZ* make very agitative puppets of the virus. Movement is always initiated and led by the jaw, with arms hung powerlessly along the shambling gait (Failes).

What the aggressive, dormant zombie characterization evokes is how digital mediation facilitates a new mode of incorporation of the individual into production. It is thus interesting to compare the body contortion between the Tiller Girls and the virtual zombies. The dance of the Tiller Girls highlights the fetishized legs, which, as Kracauer says, mirrors the hands by the assembly line, healthy, efficient, and precise. By contrast, *WWZ* never characterizes the zombie body as vulnerable or susceptible to dismemberment, but only partially rag-doll—reflecting the post-Fordist preoccupation with flexible specialization. So instead of the fragmentation of body/labor, post-Fordist digital mediation requires the wholesale subsumption of the worker's body and intellect. Johnathan Crary summarizes the situation most compellingly in *24/7: Late Capitalism and the Ends of Sleep*:

It is only recently that the elaboration, the modeling of one's personal and social identity, has been reorganized to conform to the uninterrupted operation of markets, information networks, and other systems. A 24/7 environment has the semblance of a social world, but it is actually a non-social model of mechanic performance and a suspension of living that does not disclose the human cost required to sustain its effectiveness. (9)

Although Crary's 24/7 description may not necessarily apply to the whole of the VFX artists and technicians, their work is notoriously labor-intensive, with long hours and pressing deadlines, and requires constant reskilling because the work is so thoroughly mediated by digital technologies. Thus, the MoP of the VFX industry and the *WWZ* zombie characterization illuminate each other.

And it is through such juxtaposition that we now see how the restless zombie struggles dialectically with the post-Fordist *Ratio*—that is, while the dormant zombie critiques the logic of the 24/7 digital mediation that extracts productivity to such a degree that it is no longer possible to have a break from work though admittedly, with digital mediation, work now grants a sense of the technological sublime with a purpose. That is how the *WWZ* zombie comes to be characterized as the limp-superhuman monster that roams freely in a contagion-globalized post-apocalyptic world. But, of course, such contradictions would not have existed without the capitalist production relations, which claim to have become more equalitarian with the rise of the network society. In the final section, I will address questions of social relations in the film narrative in light of the network society and its neoliberal tendency.

## Social Relations in the Post-Fordist World

In Romero's *Living Dead* series, the drama of the in-fighting among the human survivors exposes the suppression of differences in a Fordist society—differences of gender, race, and class, lending weight to the charge that the ruthless Fordist standardization leads to social conformism. In turn, zombification mimics Fordist sameness and yet radicalizes it to such a point as to completely level social differences—making it truly democratic and equalitarian, albeit negatively. The zombies may wear the clothes that signify professions and human identities, but they are equalized once zombified. In a zombie post-apocalypse, social norms lose meaning because the negative mass ornament of the zombie horde comes to reverse power relations for the living: the greedy, selfish, violent, and merciless white men are more likely to be devoured by zombies than the compassionate, brave, and cool-headed women and black men, who collaborate well and value survival skills.<sup>7</sup>

By contrast, *WWZ* is predicated on a power relation between the elite and the helpless masses, and therefore the struggles among the human survivors now

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<sup>7</sup> This theme is much more prominent in Romero's *Night of the Living Dead* (1968) and *Day of the Dead* (1978). For more discussion in this regard, see Wood, *Hollywood* and "Apocalypse Now"; and Ryan and Kellner.

seem more silent and less effective. In the film, Gerry and his family are extracted by an armed helicopter because of his association with the U.N. But the only safe haven from zombie invasion in the film is the navy vessel anchored in the ocean. In order to earn a spot on the navy vessel for his family, Gerry agrees to take on the dangerous mission of investigating the virus cure. As one military commander urges Gerry to take on the mission, the ship is a space exclusive to people who “serve a purpose.” As soon as the U.N. presumes Gerry is dead after the airliner crashes, they evict his family from the navy vessel. In other words, privilege and status are more crucial to survival than skills and human collaboration. In the network society parlance, the survival of the Lane family hinges upon access to the U.N. military network. Ironically, the network parlance is a convenient mask for exclusion and selectivity, which underlines the fact that class division not only persists but does so nakedly.

Indeed, the depiction of class in the film contradicts Castells’s prediction of the disappearance of class in the network society on account of the transformations in the work process:

Labor loses its collective identity, becomes increasingly individualized in its capacities, in its working conditions, and in its interests and projects. Who are the owners, who the producers, who the managers, and who the servants becomes increasingly blurred in a production system of variable geometry, of teamwork, of networking, outsourcing, and subcontracting. (*Rise* 506)

While this vision can be taken as some kind of digital utopianism—that everyone involved in the production process can contribute to a common goal according to their own capacity on equal footing—it is highly problematic. As far as the distribution of surplus value is concerned, the blurring of titles and the supposed camaraderie and teamwork only appear to be all the more specious. But as Rob Wilkie argues, the fundamental flaw of the network society utopianism is that Castells confuses workplace culture with the material condition of the workers:

The main crux of their [Thomas Friedman, Castells] argument is to deny the continued existence of exploitation and therefore to deny the historical relation of globalization to class society by making it appear that changes in the culture of the workplace—for example, the shift from the rigid structures of Fordism to the flexible structures of post-Fordism—bring about a fundamental material change in the class position of workers. (60)

Besides the denial of class in the name of post-Fordist workplace culture, the main pitfall of the “individualized labor” thesis is that it fails to recognize that labor is *always* social, whether the work process is individualized or not. And because of the social nature of labor, production relations remain the dialectical component of the mode of production, which continues to be capitalistic in the network society. Therefore, as Wilkie argues, the network society is still a class society. And as *WWZ* tells the story, class relations can masquerade as access to the network and become more selective and exclusive as we have seen in the human survivors in the film.

Compared with the human survivors, the digital undead in *WWZ* presents a much more provocative reflection on the network society. Unlike any other existing zombies so far, the *WWZ* zombies are strangely picky about to whom they want to transmit the virus. At the end of the film, the world war against the zombies is finally won not because a cure has been developed, but because Gerry correctly speculates that the zombie virus can detect illness. At the WHO lab, Gerry asks for “a vaccine that works like a camouflage. They keep people who receive it invisible to the infected.” That is, as the undead, the zombies nevertheless bypass weak, senile, or diseased people because they demand a healthy host to spread the disease. Once the humans understand this and begin to inject themselves with a fake deadly virus, the zombie virus can no longer spread and thus the pandemic comes to an end.

While the choosy zombie might be the best in-joke for a zombie movie, it is with such a selective contagion discourse that the *WWZ* zombies question the neutrality of the network society theory. According to Castells, “the programmers” and “the switchers” are the elite “social actors”: while the former possesses “the ability to program/reprogram the network(s) in terms of the goals assigned to the network,” the latter possesses “the ability to connect different networks to ensure their cooperation by sharing common goals and increasing resources” (“Informationalism” 32). By rejecting unfit hosts, the *WWZ* zombies actually take the role of “programmers,” reprogramming the human society and instituting an infallible zombie network society. In other words, the neutrality of the network society is nothing but a myth. But the *WWZ* zombie virus goes one step further. It is uncanny as to how the choosy zombie virus delivers the true paradox of capitalism. As Joan Robinson famously remarks, “The misery of being exploited by capitalists is nothing compared to the misery of not being exploited at all” (46). Those who are incapable of participating in the new zombie reprogramming will be left to perish with the human society, just like the surplus population that has to struggle with extreme poverty for their failure to be exploited by capitalism.

Finally, the question of labor exploitation provides us with a neoliberal perspective on the choosiness of the *WWZ* zombie. What in the network society theory has been left out of flexible specialization is the requirement of government regulation and social welfare, as already foreseen by Piore and Sabel (32). A. J. Phillimore notices that even the optimistic proponents of flexible specialization worry that the dualism of core and periphery jobs will be exploited (82). In retrospect, their worries were eventually borne out. By the early 2000s, flexible specialization has become what David Harvey calls flexible accumulation—“a highly exploitative system”—in his important book on neoliberalism (72). As Harvey contends, “Flexible specialization can be seized on by capital as a handy way to procure more flexible means of accumulation. . . . The general outcome is lower wages, increasing job insecurity, and in many instances loss of benefits and of job protections” (76). Allan Lipietz, a French regulation school theorist, concurs that the transition from Fordist society to post-Fordist can be described as a transition from the Hot-Air Balloon Society into the Hourglass Society, with the sense of constant upward social mobility being replaced by labor precarity (18-33). Therefore, although Castells also addresses the periphery/core labor dualism, the denial of class simply bypasses the ongoing deterioration of labor conditions. With unionization in decline, financial institutions deregulated, work increasingly casualized, and tax breaks for big corporations and the wealthy favored, wages stagnate while billionaires multiply around the world. In a word, proletarianization.

All in all, the new mass ornament of the zombie digital multitude illuminates the ongoing transformations in the sphere of productive forces and production relations, and vice versa. If, as Whissel suggests, the digital multitude embodies the call for immediate collective action, then the zombie digital multitude is preoccupied with the struggle against the post-Fordist *Ratio* for an alternative mode of production. Equally globalist and digital, the zombie digital multitude nevertheless aspires to break free from the capitalist *Ratio*, which has mutated from labor rationalization to flexible accumulation so as to exploit higher productivity with less wages, all in the name of craftsmanship and individualism. But at the same time, thanks to the post-Fordist international division of labor and digital connectivity, the global masses are working more closely than ever, much like the seemingly collaborative swarms of zombies in *WWZ*. The simulated zombies are mobilized on a veritable global scale, taking over the world with superhuman speed and resourcefulness, with an intent to institute an infallible network where every zombie is equal and invincible. In such a way, the epic collective action of the *WWZ* zombies presents to us a negative utopianism. Thanks to the globaliza-

tion process and digital mediation, post-Fordism may in turn provide a favorable condition for global collective action, with capitalists being the grave-digger providing the very tool for revolution that Marx once prophesized.

## WORKS CITED

- Amin, Ash. Introduction. *Post-Fordism: A Reader*. Oxford, UK: Blackwell, 1994. 1-40.
- Boluk, Stephanie, and Wylie Lenz. "Infection, Media, and Capitalism: From Early Modern Plagues to Postmodern Zombies." *Journal for Early Modern Cultural Studies* 10.2 (2010): 126-47.
- Braverman, Harry. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*. 25th Anniversary ed. New York: Monthly Review, 1998.
- Cameron, Allan. "Zombie Media: Transmission, Reproduction, and the Digital Dead." *Cinema Journal* 52.1 (2012): 66-89.
- Castells, Manuel. "Informationalism, Networks, and the Network Society: A Theoretical Blueprint." *The Network Society: A Cross-Cultural Perspective*. Ed. Manuel Castells. Cheltenham: Edward Elgar, 2004. 3-48.
- . *The Rise of the Network Society*. 2nd ed. Oxford, UK: Wiley-Blackwell, 2010.
- Christopherson, Susan. "Behind the Scenes: How Transnational Firms are Constructing a New International Division of Labor in Media Work." *Geoforum* 37.5 (2006): 739-51.
- Christopherson, Susan, and Michael Storper. "The Effects of Flexible Specialization on Industrial Politics and the Labor Market: The Motion Picture Industry." *Industrial and Labor Relations Review* 42.3 (1989): 331-47.
- Crary, Johnathan. *24/7: Late Capitalism and the Ends of Sleep*. London: Verso, 2013.
- Dinerstein, Joel. *Swinging the Machine: Modernity, Technology, and African American Culture between the World Wars*. Amherst: U of Massachusetts P, 2003.
- Failes, Ian. "Zombie Warfare: World War Z." *FX Guide*, fxguide LLC, 26 June 2013. Web. Accessed 16 Jan. 2019.
- Gilloch, Graeme. *Siegfried Kracauer: Our Companion in Misfortune*. Cambridge, UK: Polity, 2015.
- Harvey, David. *A Brief History of Neoliberalism*. Oxford, UK: Oxford UP, 2007.
- Holmes, Stephen. "Digital Dead: Creating World War Z." *3D Artist* 7 Dec. 2013. Web. Accessed 23 Jan. 2018.
- Hughes, Roger. "A Continuum Theory for the Flow of Pedestrians." *Transportation Research Part B: Methodological* 36.6 (2002): 507-35.
- Hurst, Adriene. "World War Z: Crowd Source." *Digital Media World*, Digital Media World, 12 July 2013. Web. Accessed 15 Dec. 2019.

The New Mass  
Ornament:  
*World War Z*

- Kracauer, Siegfried. "The Mass Ornament." *The Mass Ornament: Weimar Essays*. Trans. Thomas Y. Levin. Cambridge, MA: Harvard UP, 1995. 75-86.
- Lauro, Sarah J., and Karen Embry. "A Zombie Manifesto: The Nonhuman Condition in the Era of Advanced Capitalism." *boundary 2* 35.1 (2008): 85-108.
- Lipietz, Alain. "The Fortunes and Misfortunes of Post-Fordism." *Phases of Capitalist Development: Booms, Crises and Globalizations*. Ed. Robert Albritton, et al. London: Palgrave, 2001. 17-36.
- Mao, Tianlu, et al. "Parallelizing Continuum Crowds." *Proceedings of the 17th ACM Symposium on Virtual Reality Software and Technology*. New York: Association for Computing Machinery, 2010. 231-34.
- McNally, David. *Monsters of the Market: Zombies, Vampires and Global Capitalism*. Leiden: Brill, 2011.
- Phillimore, A. J. "Flexible Specialisation, Work Organization and Skills: Approaching the 'Second Industrial Divide.'" *New Technology, Work and Employment* 4.2 (1989): 79-91.
- Phillips, Gyllian. "White Zombie and the Creole: William Seabrook's *The Magic Island* and American Imperialism in Haiti." *Generation Zombie: Essays on the Living Dead in Modern Culture*. Ed. Stephanie Boluk and Wiley Lenz. New York: McFarland, 2011. 27-40.
- Piore, Michael, and Charles Sabel. *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic Books, 1984.
- Reeh, Henrik. *Ornaments of the Metropolis: Siegfried Kracauer and Modern Urban Culture*. Trans. John Irons. Cambridge, MA: MIT P, 2004.
- Reeves, W. T. "Particle Systems: A Technique for Modeling a Class of Fuzzy Objects." *ACM Transactions on Graphics* 2.2 (1983): 91-108.
- Reynolds, Craig. "Flocks, Herds, and Schools: A Distributed Behavioral Model." *ACM SIGGRAPH Computer Graphics* 21.4 (1987): 25-34.
- Rhodes, Gary D. *White Zombie: Anatomy of a Horror Film*. Jefferson: McFarland, 2006.
- Rhythm & Hues: Life after Pi*. Dir. Scott Leberecht. YouTube, 25 Feb. 2014. Web. Accessed 15 May 2018.
- Robinson, Joan. *Economic Philosophy: An Essay on the Progress of Economic Thought*. Harmondsworth: Penguin, 1964.
- Ryan, Michael, and Douglas Kellner. *Camera Politica: The Politics and Ideology of Contemporary Hollywood Film*. Bloomington: Indiana UP, 1988.
- Shaviro, Steven. *The Cinematic Body*. Minneapolis: U of Minnesota P, 1993.
- Tai, Peng-yi. "Guaishou dianli gongsi: Pikesi de xinjingji meixue" ("Monster, Inc.: The Pixar Aesthetics of the New Economy"). *Chung Wai Literary Quarterly* 45.1 (2016): 85-117.

- Thalmann, Daniel, and Soraia Raupp Musse. *Crowd Simulation*. 2nd ed. London: Springer, 2013.
- Walker, Gregory A. *The Living and the Undead: Slaying Vampires, Exterminating Zombies*. Urbana: U of Illinois P, 2010.
- Weta. *The Art of Film Magic: 20 Years of Weta*. New York: Harper Design, 2014.
- Whissel, Kristen. *Spectacular Digital Effects: CGI and Contemporary Cinema*. Durham: Duke UP, 2014.
- Wilkie, Rob. *The Digital Condition: Class and Culture in the Information Network*. New York: Fordham UP, 2011.
- Wood, Robin. "Apocalypse Now: Notes on the Living Dead." *American Nightmare: Essays on the Horror Film*. Ed. Andrew Britton, et al. Toronto: Festival of Festivals, 1979. 91-97.
- . *Hollywood from Vietnam to Reagan . . . and Beyond*. Revised and expanded ed. New York: Columbia UP, 2003.
- World War Z*. Dir. Marc Forster. Paramount Pictures, 2013.
- Zeltzer, David. "Motor Control Techniques for Figure Animation." *IEEE Computer Graphics and Applications* 2.9 (1982): 53-59.

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