

“Nightmare Horrors and Perils of the Night”: Zombies and Modern Science

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*Science (so noble in origin and original purpose) has produced in alliance with sin nightmare horrors and perils of the night before which giants and demons grow pale.*¹ – J.R.R. Tolkien

In the second half of the twentieth century, the zombie has increasingly become the poster child for the collection of cinematic monsters that have captivated the imaginations of film directors and their audiences. From multiple encyclopaedic compendia and myriad graduate student theses to articles in *The Economist*, *Popular Mechanics*, and *Newsweek*, popular culture pundits and academics from across the disciplines are pondering the increasing popularity of these unlikely cinematic darlings. Zombies are devoid of social skills, aesthetic properties, and basic hygiene. They lack the eroticism of the vampire, and never ask their victims if they want to be “turned”. Rather, they are usually portrayed as part of a mindless, marauding hoard driven by the single-minded primeval urge to feed on human flesh. But this has not always been the cinematic vision of the undead. In the first few decades of the zombie’s film history, it was still recognizable as human, a silent, lumbering slave who often menaced rather than killed, and would never think (if they thought at all) of eating their victims. These early cinematic zombies were created using some semblance of traditional Haitian rituals, and even if their creator was a scientist, science had very little to do with it.

Then the world changed. On 16 July 1945, American scientists tested the first nuclear bomb, and less than a month later used this terrifying weapon on Japanese civilians in order to end World War II. At that first test in Alamogordo, New Mexico, lead physicist J. Robert Oppenheimer recalled a quotation from the Hindu scripture,

¹ Verlyn Flieger and Douglas A. Anderson, *Tolkien on Fairy-stories* (London: Harper Collins, 2008), p.269.

The Bhagavad Gita: “Now I am become death, the destroyer of worlds.”² While Oppenheimer later admitted that he was “a little scared of what I had made”,³ and tried (in vain) along with many of his Manhattan Project colleagues to prevent the development of the even more destructive hydrogen “super” bomb, he hid behind the party line of scientists in claiming that he (and they) could not be held accountable for the misuse of their discoveries. “If you are a scientist,” he argued, “you believe that it is good to find out how the world works; that it is good to find out what the realities are; that it is good to turn over to mankind at large the greatest possible power to control the world...”⁴ Some scientists may earnestly believe that the situation is so clearly black and white, but as the arts have shown us, the world is filled with fascinating shades of grey. Science does not exist in a vacuum; rather, it is the vocation of *scientists*, who, as humans, are certainly not infallible. While, as Tolkien noted, the goal of science may be noble in principle, scientists as individuals cannot be expected to be any nobler than the general public, especially when their funding is provided by large military complexes or global corporations (whose motivations are certainly considered less than noble in the eyes of the general public).

Enter the stereotype of the mad scientist, overstepping the bounds of what is “natural” and falling into the trap of “playing God”. Since the publication of Mary Shelley’s *Frankenstein* in 1818, some in the general public have looked at the scientific establishment with suspicious eyes. Modern marvels such as genetic engineering, nuclear energy, and nanotechnology only further their mistrust of science, as they see the modern equivalent of a genie released from its bottle with little thought as to the possible outcomes. A significant percentage of the general public worries, based on what surveys demonstrate is an incomplete understanding of the basic science,⁵ if the Large Hadron Collider will create a black hole that could destroy the earth. They question why the U.S. military stockpiles smallpox and anthrax in high security laboratories, and question the wisdom of changing the genetic structure of bacteria, crops, and livestock. It appears that with each scientific advance

² “J. Robert Oppenheimer Interview”, *A.J. Software and Multimedia*, <http://www.atomicarchive.com/Movies/Movie8.shtml>, accessed 3 January 2011.

³ Gerard J. De Groot, *The Bomb* (Cambridge, MA: Harvard University Press, 2005), p.112.

⁴ *Ibid.*

⁵ The National Science Board has been tracking the public’s attitudes towards and knowledge of science for several decades. *Science and Engineering Indicators: 2010* can be found at <http://www.nsf.gov/statistics/seind10>.

there seems to be yet another theoretical opportunity for the world to destroy itself, whether through nuclear holocaust, pandemic, or deadly material returned to our planet through some space mission. The modern zombie can therefore be thought of as the bastard child of science, a metaphor for the horrors – both real and perceived – that may unintentionally befall humanity as a result of cutting-edge scientific research. The methods of zombification portrayed in films in recent decades reflect the general public’s fears about what many believe modern science has (or has the potential to) become, especially in partnerships with military and corporate institutions – the so-called “military industrial complex”. This essay will explore examples of some of the most widely-used “scientific” causes of zombification, and illustrate how these films reflect real-world concerns of science and ethics.

The number of zombie films which feature archetypal mad scientists is legion. Two representative examples separated by six decades are *The Walking Dead* (1936) and *House of the Dead* (2003). In the former, Boris Karloff stars as an executed prisoner who is resurrected by an unscrupulous scientist obsessed with the secrets of life and death. The more recent film centres on college students who attend an ill-fated rave on a mysterious island and become the prisoners of an evil scientist who has developed an immortality serum which he has not only used on himself, but also has used to create zombies. Some works openly embrace the Frankenstein comparison, as in the case of George A. Romero’s *Day of the Dead* (1985), where the mentally unbalanced scientist Dr. Logan is openly referred to as “Frankenstein” by both his fellow scientists and the military personnel sharing their bunker. In Robin Becker’s 2010 novel *Brains: a Zombie Memoir*, the scientist who develops the zombie-creating biochemical agent is named Dr. Howard Stein. Former English professor-turned-zombie Dr. Jack Barnes refers to Stein as “my creator. Our father, Mad Scientist Extraordinaire. God in the Garden of Evil.”⁶ Like Shelley’s protagonist, Howard Stein spurns his creation, explaining to Jack that he and the other still-cognisant zombies are “a mistake. Something out of *Frankenstein*.”⁷

Perhaps the most (in)famous mad scientist of zombie films is Herbert West of the *Re-Animator* series. Loosely based on a short story by H.P. Lovecraft, the original film introduced audiences to the megalomaniac young scientist West and his glow-in-

⁶ Robin Becker, *Brains: A Zombie Memoir* (New York: Eos, 2010), p.4.

⁷ Becker, *Brains*, p.178.

the-dark green reanimating reagent. With a complete disregard for both the ethical mores of the medical establishment and the Miskatonic Medical School student handbook, West conducts his reanimation experiments on both animals and humans – seen by him as simply objects on which to test his serum – without seeming concern for either the wishes of those experimented on or the unpredictable and unstable results of these experiments. “I’ve conquered brain death,” he boasts to roommate and fellow medical student Dan Cain. “We can defeat death. We can even achieve every doctor’s dream and live lifetimes.”⁸ While it can be debated whether or not West was right about physicians’ aspirations, the viewer can certainly interpret the film as a cautionary tale against unrestricted, profit-driven medical research, especially such experiments in which the unwilling participants have not given their informed expressed consent.

In *Film, Horror, and the Body Fantastic*, Linda Bradley sees *Re-animator* and similar works from the 1980s as reflecting not only on the objectification but the intentional commoditisation of the human body, both as a whole and as a semblance of pieces. For example, in *Re-animator* West injects the head and decapitated corpse of rival scientist Hill, noting with enthusiasm “Yes, parts. I’ve never done whole parts.”⁹ In *The Return of the Living Dead* (1985) the reanimating gas causes individual body parts and dogs sliced in half for medical school demonstrations to move on their own. In Bradley’s words, “the horror and the real monster had become the body itself.”¹⁰ The zombie horrifies us not only because it wants to eat our flesh, but because it violates the presumed sanctity of the body, and robs us of the promise of a peace after death – so much for “rest in peace”. In the early scenes of *Dawn of the Dead*, corpses are not objectified, but initially humanised, given last rites and covered in shrouds before being locked into a low-income housing unit’s basement storage cage, despite the fact that the next-of-kin know what their family members will become. “Why do these people keep them here?” Roger asks. Fellow SWAT team member Peter explains, “because they still believe there’s respect in death.”¹¹ As

⁸ Dennis Paoli, William J. Norris, and Stuart Gordon, *Re-animator*, directed by Stuart Gordon (1985; Troy, MI: Anchor Bay Entertainment, 2007), DVD.

⁹ Ibid.

¹⁰ Linda Bradley, *Film, Horror, and the Body Fantastic* (Westport, CT: Greenwood Press, 1995), pp.73-74.

¹¹ George A. Romero, *Dawn of the Dead*, directed by George A. Romero (1978; Troy, MI: Anchor Bay Entertainment, 2004), DVD.

long as one considers zombies as human, there is an emotional attachment, and disposing of the bodies in a violent and callous way (beheading or burning) becomes difficult. However, as the epidemic spreads and the main characters (the two SWAT team members and two television journalists) barricade themselves in a shopping mall, the zombies are increasingly seen as (and treated like) objects, an admittedly dangerous form of trash that must be unceremoniously disposed of. The zombies – useless commodities – stand in stark opposition to the riches of the mall’s stores and restaurants which sustain the characters over several months.

Similar to *Dawn of the Dead*’s mall dwellers, cinematic scientists have no compunctions about dispatching zombies, often after having conducted vivisection or other experiments upon them. These scientists are portrayed as logical, detached, and mechanical. Just as they can inflict pain on a lab rat in the name of science, or disembowel a cadaver with clinical precision, scientists in zombie movies are above thinking of zombies as human. Similarly, a soldier thinks of the zombie as the enemy, a target to be eliminated. But in many zombie films, some characters openly consider whether or not zombies actually retain some of their humanity, and therefore are still deserving of basic human rights. This way of thinking puts these characters in direct opposition to the military and scientific perspectives depicted in the films. For example, in the 2006 Canadian dark comedy *Fido*, Jon Bottoms, a nefarious former Zombie Wars hero and ZomCon head of security, visits a school classroom. Young Timmy Robinson asks if zombies are dead or alive. Bottoms warns Timmy and the other children that although “to some people zombies might seem human,” they are in fact “creatures [with] only one goal, and that is to eat your flesh.”¹² In *Night of the Living Dead*, Dr. Grimes dispassionately describes an experiment in which a cadaver whose four limbs had been amputated came back to life. He calmly instructs people to dispose immediately of all corpses through burning, and that “the bereaved will have to forgo the dubious comfort that a funeral service will give. They’re just dead flesh, and dangerous.”¹³ While corpses are only seen as dangerous in works of art such as film and literature, corpses themselves are sometimes seen by some *as* works of art, or more basely as cash-generating commodities to be bought and displayed, for

¹² Robert Chomiak, Andrew Currie, and Dennis Heaton, *Fido*, directed by Andrew Currie (2006; Santa Monica, CA: Lionsgate, 2007), DVD.

¹³ George A. Romero and John A. Russo, *Night of the Living Dead*, directed by George A. Romero (1968; New York: The Weinstein Company, 2008), DVD.

example in exhibits of plastinated corpses and body parts such as *Bodies Revealed* and *Human Body Worlds*. In the case of at least one such exhibit, *Bodies: the Exhibition*, there have been allegations that the bodies were those of Chinese prisoners procured from the black market.¹⁴

Not only are entire bodies procured without the consent of the deceased or their kin (as was done in past centuries in the case of grave robbers supplying cadavers to medical schools), but individual body parts can likewise be illegally obtained. The infamous “Travellers Beware” viral email from 1997 purported to tell the true story of business travellers waking up in a bathtub of ice and missing a kidney. This urban legend is possibly based on a 1989 news story out of London about a Turkish citizen who claimed he was lured to London under false pretence and had a kidney stolen. However, it turned out that he had in fact advertised his kidney for sale in a Turkish newspaper.¹⁵ There have been a number of large-scale black market organ rings broken up across the world in the past few decades, in which profit-driven doctors prey on poor, uneducated people as the unwilling (or at least uninformed) donors, and rich and desperate Westerners as the recipients of the ill-gotten organs. For example, the World Health Organization estimates that a fifth of the 70,000 transplanted kidneys each year are illegally procured.¹⁶ But shadowy black markets are not the sole illegal source of human body parts and tissues. In 1997 it was disclosed that the Los Angeles County Coroner’s Office was harvesting corneas from corpses and selling them to tissue banks without the next-of-kin’s consent.¹⁷ Unscrupulous funeral home and crematorium directors, as well as employees at one noted medical school, have succumbed to the high prices which pharmaceutical companies, surgical instrument companies, and tissue banks are willing to pay for human tissues and body parts.¹⁸

¹⁴ Brian Ross, Rhonda Schwartz, and Anna Schecter, “N.Y., China Investigating Black Market in Bodies”, *ABC News* (15 February 2008), http://abcnews.go.com/id=4296982_ accessed 3 January 2011.

¹⁵ Barbara Mikkelson and David P. Mikkelson, “You’ve Got To Be Kidneying”, (12 March 2008), <http://www.snopes.com/horrors/robbery/kidney.asp>, accessed 3 January 2011.

¹⁶ Janeen Interlandi, “Not Just an Urban Legend”, *Newsweek* (10 January 2009), <http://www.newsweek.com/2009/0109/not-just-urban-legend.html>, accessed 3 January 2011.

¹⁷ Karen Brandon, “Mortician Accused of Selling Body Parts”, *Chicago Tribune* (25 February 2002), http://articles.chicagotribune.com/2002-02-25/news/0202250134_1_michael-francis-brown-corneas-body-parts, accessed 3 January 2011.

¹⁸ Alan Zarembo and Jessica Garrison, “Profit Drives Illegal Trade in Body Parts”, *LA Times* (7 March 2004), <http://articles.latimes.com/2004/mar/07/local/me-parts7>, accessed 3 January 3, 2011.

Zombie films have long capitalised on the public's fears about illegal organ harvesting. For example, in *The Mad Ghoul* (1943), mad scientist Dr. Morris uses fresh human hearts (and an ancient Egyptian poison) to reanimate corpses, while in *Doctor Blood's Coffin* (1960) the eponymous medical student transplants hearts cut from the chests of still-living donors into dead bodies in order to reanimate them. The zombie film *Monstrosity* (1963) tells the story of a mad scientist who aids an elderly woman in her plot to transplant her brain into a more youthful body. New York police follow a trail of missing body parts and mutilated corpses to a zombie-creating mad scientist in *Dr. Butcher, M.D.* (1980), while in *The Chilling* (1989) the president of a cryogenics laboratory sells the organs of those he is supposed to be protecting in cold storage, until a freak storm turns the frozen patients into zombies. In the misuse of human tissues and organs, profit is the underlying motivation. There is money to be made, and there are those in the medical community who ignore both morality and legality in order to profit from such activities.

While capitalism is generally favoured over other economic systems by most Americans, the general public is all-too-aware of the inherent dangers of large corporations insinuating themselves into our lives (at the cost of all other competition). For example, there are those who refuse to shop at Walmart and refer to Microsoft as the "Evil Empire", choosing to use other computer products whenever possible just on principle. In several recent zombie films, the intersection of science and profit plays a central role, in the guise of unethical super-corporations whose activities either create the zombies, or use the zombies as an excuse to control society as a whole. The first film in the *Resident Evil* series (2002) begins with a confidential file on the Umbrella Corporation, outlining the scope of its influence. It is described as a ubiquitous commercial enterprise that is funded by the military and specialises in genetic experimentation and viral technology.¹⁹

As Alice, the heroine of the series, slowly regains her memory throughout the film, the viewer learns that she had planned to steal the Umbrella Corporation's bio-engineered T-virus from the subterranean Hive laboratory in order to bring down the all-powerful unethical corporation (whose trademark can be found on everything from bullets to wedding rings in the film). Spence (like Alice, a security officer who was

¹⁹ Paul W.S. Anderson, *Resident Evil*, directed by Paul W.S. Anderson (2002; Culver City, CA: Sony Home Entertainment, 2008), DVD.

supposed to be guarding the mansion entrance to the Hive) actually steals the virus and antivirus for monetary gain. Despite the damage the T-virus does to the planet once it escapes from the Hive, the Umbrella Corporation continues to experiment with its deadly product in the remaining films in the series. Their goal is not to cure what remains of humanity, but instead to control both the zombies and the human survivors, and therefore rule the world. In *Resident Evil: Afterlife* (2010), Umbrella Corporation chief Albert Wesker injects Alice with a serum which neutralises the T-virus, thus deactivating the telekinetic and extrasensory powers, superhuman strength, extreme agility, and seemingly limitless healing ability the virus had granted her. “Umbrella Corporation is taking back its property”, he sneers. “You didn’t work out, so you’re being recalled.”²⁰ Although Alice is clearly being referred to as a product, a thing, she actually thanks Wesker for returning her humanity to her. In the eyes of the corporation, their exclusive virus (with which they had intentionally infected her) had turned her into a commodity; hence she is often referred to as “Project Alice” by Umbrella scientists and executives throughout the series. Alice recognises that she has been dehumanised by this process, by the experiments that were done upon her without her knowledge or consent, and therefore welcomes the chance to be cured of what she considers to be a disease.

A less overtly evil (but equally manipulative) science-based corporation is *Fido*’s ZomCon. The film opens with a black and white newsreel extolling the virtues of ZomCon and its role in winning the Zombie Wars, as well as its centrality in securing the safety of the suburban way of life. ZomCon controls not only the zombies, but every aspect of society, from burials to school curricula, and the ZomCon logo appears on items from cars to caskets. The society of *Fido* is reminiscent of George Orwell’s *1984* and similar dystopias in the way that information is controlled and spun for public consumption. In one of the more disturbing references in the film, Ray and Stan, the school bullies, are uniformed “ZomCon Cadets”, an organisation which appears to owe more to the Hitler Youth than the Boy Scouts (including violence against those who do not follow the ZomCon party line).

²⁰ Paul W.S. Anderson, *Resident Evil: Afterlife*, directed by Paul W.S. Anderson (2010; Culver City, CA: Sony Home Entertainment, 2010), DVD.

One cannot raise the spectre of the Nazi Party without considering the horrors they propagated on humanity. One class of atrocities in particular was done with the help of science, namely human experimentation. Although a complete examination of the barbaric experiments perpetrated on concentration camp victims is certainly beyond the scope of this work²¹ (as is a detailed exploration of a subgenre of zombie films that feature Nazis), it should be noted that they included (but were not limited to) the intentional infliction of gangrene and mustard gas wounds; infecting victims with malaria and typhus; simulations of high altitude (low oxygen) conditions; freezing experiments; forcing victims to drink sea water; and Josef Mengele's infamous experiments on twins. However, despite the fact that the Nazi experiments are perhaps the most well-known (thanks in part to the Nuremberg Trials), they are by no means isolated cases in the twentieth century. For example, during the Second Sino-Japanese War (1937–1945) and World War II, Japan's Unit 731 did their own experiments on the effects of freezing conditions on the human body (using Chinese prisoners of war) and studied the effects of plague and other diseases on the human body through the vivisection of both living and dead Chinese victims (some of the former without the benefit of anaesthesia).²²

Nor was the United States above conducting secret (and not-so-secret) human experiments without the informed consent of the participants. Between 1950 and 1975 the U.S. Army conducted experiments on nearly 7000 human subjects which studied the effects of nerve gas, psychotropic chemicals, and pain killers as incapacitating agents for use in warfare.²³ But by far the most infamous example of American human experimentation is the "Tuskegee Study of Untreated Syphilis in the Negro Male," a forty-year study conducted by scientists associated with the U.S. Public Health Service of the effects of syphilis on over 400 African-American men in Alabama who were not even told that they had the disease. What is perhaps most alarming about this event is that it was not concealed, but in fact was openly discussed in medical journals and conferences. It was not until the media caught wind

²¹ A more detailed study of Nazi human experiments can be found in Vivien Spitz, *Doctors from Hell: the Horrific Account of Nazi Experiments on Humans* (Boulder, CO: Sentient Publications, 2005) and Lucette Matalon Lagnado and Sheila Cohn Dekel, *Children of the Flames: Dr. Josef Mengele and the Untold Story of the Twins of Auschwitz* (New York: Morrow, 1991).

²² Gerhard Baader Susan E. Lederer, Morris Low, Florian Schmaltz, and Alexander v. Schwerin, "Pathways to Human Experimentation, 1933-1945: Germany, Japan, and the United States", *Osiris* 20 (2005), p.221.

²³ Jonathan D. Moreno, *Undue Risk* (New York: W.H. Freeman, 2000), p.251.

of the study that it was quickly ended in the 1970s.²⁴ A lingering side effect of this study is a distrust of the medical establishment by a segment of the African-American community, including a persistent urban legend that AIDS was created by the U.S. government specifically to infect African-Americans.²⁵ In 2010, medical historian and Tuskegee experiment expert Susan Reverby of Wellesley College uncovered an eerily similar experiment in Guatemala funded by the U.S. National Institutes of Health. Between 1946 and 1948 nearly 700 Guatemalan prisoners and mental hospital patients were infected with syphilis in order to test the effects of penicillin on disease prevention.²⁶

Psychologists have studied these instances of institutionalised abuse and have found that perpetrators often justify the abuse by visualising and referring to the victims as something other than human, or as humans of somehow less intrinsic value than him or herself. For example, Japanese researchers in Unit 731 not only viewed the Chinese prisoners as intrinsically inferior to Japanese citizens, but in documents referred to the Chinese prisoners as “research material”, “monkeys”, or even “logs”.²⁷ Similarly Nazi scientists viewed the concentration camp victims (Jews, Roma, homosexuals, and other marginalised and oppressed groups) as less than human, for example referring to the female inmates at the Ravensbrück concentration camp as “rabbit girls”.²⁸

As previously noted, in a number of zombie films, scientists are depicted as accentuating the differences between humans and zombies (in a clearly hierarchical schemata), labelling them as “other” and inhuman. This opens the door to all manner of gruesome scientific experimentation on zombies (and other humans) in the name of science. For example, in *Dawn of the Dead*, the scientist character known in popular culture circles as “Patchy” explains without emotion that zombies are not cannibals because cannibalism occurs within a species. “These creatures cannot be considered human”, he explains. “They prey on humans. They do not prey on each other.”²⁹ As previously noted, in the *Resident Evil* series, Alice is clearly viewed as a commodity,

²⁴ James H. Jones, *Bad Blood*, rev. ed. (New York: Free Press, 1993), p.7.

²⁵ Jones, *Bad Blood*, pp.220-21.

²⁶ Donald G. McNeil, Jr., “U.S. Apologizes for Syphilis Tests in Guatemala”, *New York Times* (1 October 2010), <http://www.nytimes.com/2010/10/02/health/research/02infect.html>, accessed January 3, 2011.

²⁷ Baader et al., “Pathways to Human Experimentation”, p.223.

²⁸ Baader et al., “Pathways to Human Experimentation”, p.230.

²⁹ Romero, *Dawn of the Dead*.

Umbrella Corporation property, and an experiment. Not only does she lack control over what is done to her own body, but over her very genetic code as well. In *Resident Evil: Extinction* (2007), Dr. Isaacs creates dozens (if not hundreds) of Alice clones, who one by one die during the course of experiments he runs upon them. When one particular clone fails to survive the test (a series of battles against mutants and machines), Isaacs instructs his assistants to “get rid of that,” and the clone is unceremoniously dumped into a cement ravine along with innumerable other clones.³⁰ The visual similarity to photographs of the disposal of concentration camp victims is certainly intentional. The Alice clones are perceived to be expendable laboratory materials, akin to bacteria being studied in a petri dish, and can therefore be discarded like ordinary trash.

Similarly, much of *Day of the Dead* centres around Dr. “Frankenstein” Logan’s experiments on the zombies. Although Logan explains that “they are us”, his treatment of his “specimens” (referred to as “dumb-fucks” by the military in this subterranean research facility) is less than humane.³¹ In one experiment he has severed all the vital organs in a zombie’s torso, leaving it basically just limbs and a brain. In another he has removed the head with the exception of the brain. A fellow scientist, Sarah Bowman, criticises Logan for what she considers pointless experiments, and is further horrified to learn that the zombie whose skull and face were removed is not a “wild” zombie but in fact the former military commander of the facility, who had recently died from a zombie attack.

While the experiments conducted on zombies reflect the general inhumanity of human experimentation in the twentieth century,³² a number of these experiments have a particular goal – to domesticate and control the zombies as one might an animal or a slave. The potential for zombies to serve as a slave underclass harkens back to the original Haitian zombie, who had lost his will and personality and was under the complete control of the voodoo master. Early zombie films relied heavily on this archetype, for example *White Zombie* (1932), generally considered the first film of the genre. *Day of the Dead*’s Dr. Logan justifies his experiments as searching

³⁰ Paul W.S. Anderson, *Resident Evil: Extinction*, directed by Russell Mulcahy (2007; Culver City, CA: Sony Home Entertainment, 2008), DVD.

³¹ George A. Romero, *Day of the Dead*, directed by George A. Romero (1985; Troy, MI: Anchor Bay Entertainment, 2003), DVD.

³² Animal experimentation and animal rights is, of course, an important related topic which is not considered here except in passing simply due to considerations of the essay’s length.

for a way that a zombie could be “domesticated. It can be conditioned to behave, the way we want it to behave.”³³ Indeed, he succeeds in getting the zombie he nicknames Bub to mimic shaving and telephone usage, and Bub even remembers how to use a gun (much to the chagrin of the vicious Captain Rhodes). Logan’s experiments mirror B.F. Skinner-type conditioning experiments done on rats and pigeons, with an added twist – to reinforce Bub’s good behaviour he rewards the zombie with his favourite food, pieces of human flesh.

The domestication of zombies is also the stated goal of some of Dr. Isaacs’ experiments in *Resident Evil: Extinction*. Isaacs injects zombie subjects with a special serum which is meant to return some intelligence and memories to the zombies and suppress their desire for human flesh. He explains to the Umbrella Corporation Board that the zombies are “animals, essentially. We can train them, if we can take away their baser instincts. They’ll never be human”; however they would provide the “basis for a docile workforce.”³⁴ He successfully tests the intelligence and problem-solving skills of zombie subjects, such as using a camera and cell phone; however, one becomes frustrated by the task of trying to fit a square peg into a round hole and attacks the lab technicians.

Zombies are used as mindless (literally) menial labourers in two other recent films, *Fido* and *Shaun of the Dead* (2004). In the former, the ubiquitous ZomCon corporation uses science and technology to solve the zombie problem through the domestication collar, which contains the zombies’ desire for human flesh, “making the zombie as gentle as a household pet.”³⁵ Zombies are used as gardeners and household servants, to entertain children, and to deliver newspapers. Some are treated like pets (for example, being kept on a leash), and the title character (named by Timmy Robinson, his owner’s son) is actually chained outside and taunted like a neglected dog. At the end of *Shaun of the Dead*, fictional television reports and programming demonstrate how the subdued zombie population is being used to collect shopping carts in parking lots and other simple tasks, and for entertainment (for example, as easily-ridiculed targets on reality shows). Shaun keeps his best friend Ed (now a zombie) chained in the backyard shed to have someone to play video games against. The objectification of zombies (and the accompanying loss of basic

³³ Romero, *Day of the Dead*.

³⁴ Anderson, *Resident Evil: Extinction*.

³⁵ Chomiak, Currie, and Heaton, *Fido*.

human rights) is a central theme in S.G. Browne's 2009 novel *Breathers: A Zombie's Lament*, in which zombies not only lose their social security numbers, but the rights to surf the internet, ride public transportation, and be seen alone in public. The main zombie character, Andy Warner, spends much of the novel being picked up and caged by Animal Control for his civil disobedience, and is frequently threatened by his mortified parents with being given to zoos, medical schools, "plastic surgery chop shops," or crash test dummy facilities.³⁶ Once again, the comparison between zombies and lab animals is intentional. A connection can also be drawn to the 2002 British film *28 Days Later*. Here the source of the zombie (or at least zombie-like behaviour) outbreak is the so-called Rage virus, which is accidentally unleashed when animal rights activists try to liberate animals from a laboratory in which the virus is being tested.

Animals have been front and centre in another of the twentieth century's controversial scientific achievements, genetic engineering. From the cloning of Dolly the sheep to the production of strains of mice genetically engineered to exhibit such human traits as baldness, obesity, and propensities for various cancers, and even the creation of a glow-in-the-dark rabbit, scientists have been able to modify the genetic code of myriad plants and animals for the perceived benefit of society. Disease-resistant wheat and vitamin-enriched rice may reduce starvation and malnutrition in Third World countries, but in many industrialised nations such genetically modified foods are viewed with suspicion at best, and through conspiracy theory lenses at worst. One of the most vocal opponents has been Britain's Prince Charles, who accused genetic engineering of taking us into "realms that belong to God and God alone."³⁷ A 2010 poll of 3000 Americans found that 93% felt that genetically modified food should be labelled as such and only 38% expressed a willingness to eat genetically modified meat products.³⁸ Such uncertainties are reflected in the 2005 film

³⁶ S.G. Browne, *Breathers: A Zombie's Lament* (New York: Three Rivers Press, 2009), p.81; p.181.

³⁷ Jeff Randall, "Prince Charles warns GM crops risk causing the biggest-ever environmental disaster", *The Telegraph* (August 12 2008), <http://www.telegraph.co.uk/earth/earthnews/3349308/Prince-Charles-warns-GM-crops-risk-causing-the-biggest-ever-environmental-disaster.html>, accessed 3 January 2011.

³⁸ "National Survey of Healthcare Consumers: Genetically Engineered Food", *Thomas Reuters* (October 2010), http://www.factsforhealthcare.com/pressroom/NPR_report_GeneticEngineeredFood.pdf, accessed 3 January 2011.

Severed: Forest of the Dead, in which the sap from genetically-engineered lumber trees creates zombies.

The public's concerns regarding another specific application of genetic engineering – cloning – has also been measured by pollsters. For example, in a 2004 Opinion Research Corporation poll 84% of those surveyed opposed the commercial cloning of pets.³⁹ Two years later, the Genetic Savings and Clone company stopped taking orders for cloning cats after only six years in operation. The National Science Foundation's *2010 Science and Engineering Indicators* surveys found that 78% of Americans oppose genetically engineering or cloning humans.⁴⁰ In addition to the charge that such experiments are tantamount to "playing God," opposition to human modifications centres around such ethical and theological issues as whether clones have souls, whether they deserve the same basic rights as other humans, whether clones could be used as organ banks for the wealthy, and if such technologies could be used to develop a race of perfect soldiers. A number of countries, including the United States and United Kingdom, have banned the cloning of adult humans,⁴¹ and bioethicist Arlene Judith Klotzko notes that "any scientist who actively engages in cloning humans in order to create a new human being risks being branded a 'mad scientist'."⁴²

Such a label certainly fits Dr. Isaacs and the other scientists of the *Resident Evil* series. In the first film, the holographic Red Queen explains that the Umbrella Corporation's bio-engineered T-virus has both "medical and military applications."⁴³ Renegade security officer Spence is killed by the mutant creature known as the Licker, called one of the Hive's "early and unstable experiments". Once the Licker feeds on Spence, it incorporates his DNA and mutates once again into a "better, faster hunter". When Matt, an activist who is also trying to bring down the Umbrella Corporation, is scratched by the Licker, he too begins to mutate, and the Umbrella Corporation Clean Team takes him away to become part of the "Nemesis program".⁴⁴

³⁹ "Animal and Pet Cloning Opinion Polls", *Center for Genetics and Society* (4 April 2005), <http://www.geneticsandsociety.org/article.php?id=470>, accessed 3 January 2011.

⁴⁰ National Science Board, *Science and Engineering Indicators*, pp.7-41.

⁴¹ Cloning of embryonic stem cells is also regulated to varying degrees, and is a controversial subject in its own right.

⁴² Arlene Judith Klotzko, *A Clone of Your Own? The Science and Ethics of Cloning* (Cambridge: Cambridge University Press, 2000), p.xxi.

⁴³ Anderson, *Resident Evil*.

⁴⁴ *Ibid.*

In the second film, *Resident Evil: Apocalypse* (2004) Matt has completely transformed into a grotesque monster, and is made to fight Alice, whose own exposure to the T-virus has mutated her in a different manner, but one which the Umbrella scientists realise might be militarily as valuable. When Alice successfully appeals to the last shred of humanity left in Matt/Nemesis, he is killed by the Umbrella forces.⁴⁵

As described above, Isaacs continues to experiment on the T-virus and the zombies it creates, under the guise of domesticating them for the Umbrella Corporation. His true motivations are to recapture Alice at any cost after she is allowed to escape, and to use his serum and her DNA to create a species of super-zombies under his control. As he explains to an Umbrella bureaucrat who questions the aggression of his zombies, “some aggression has its uses”. His new tests focus on clones of Alice, which he treats like lab rats, forcing them to negotiate a maze of mortal dangers. When clone number 87 momentarily appears successfully to reach the final stage of the test, Isaacs gloats that his research “will change the face of everything”,⁴⁶ only to be faced with yet another failure. When Isaacs is bitten by one of his super-zombies, he injects himself with an overdose of the anti-virus, and mutates into a grotesque physical form worthy of his inner monstrosity. He taunts Alice with the fact that even though he used to think she was the future, he has come to understand that his new form is the true realisation of that goal. In the next film in the series (2010’s *Resident Evil: Afterlife*), the nefarious Andrew Wesker has become a mutant through exposure to the T-virus, and seeks to “ingest” Alice in order to regain control over the virus within his body. In keeping with the Umbrella Corporation’s patent disregard for human dignity, the tanker ship *Arcadia* sails the Pacific coastline kidnapping uninfected survivors in order to have fresh specimens for their scientific experiments.⁴⁷

Biochemical agents and genetic engineering are used to create an army of zombie soldiers in a number of other films. For example, in *Shock Waves* (1977), the legendary Peter Cushing plays a Nazi officer who was responsible for a band of indestructible undead storm troopers called the Death Corps. Dr. Hill’s ultimate plan

⁴⁵ Paul W.S. Anderson, *Resident Evil: Apocalypse*, directed by Alexander Will (2004, Culver City, CA: Sony Home Entertainment, 2008), DVD.

⁴⁶ Anderson, *Resident Evil: Extinction*.

⁴⁷ Anderson, *Resident Evil: Afterlife*.

in *Re-animator* is to use West's reagent and his own laser lobotomy procedure to create an army of zombies who will give him "undreamed of power".⁴⁸ A group of teenagers attempt to rescue a friend from Hybra Tech's experiments with Trioxin 5 in *Return of the Living Dead: Necropolis* (2005), and discover the corporation's plot to create an army of zombie soldiers. The creation of zombie soldiers by the U.S. Army during the Vietnam War is central to the plotline of *Automaton Transfusion* (2006), and *Flight of the Living Dead: Outbreak on a Plane* (2007) featured a genetically engineered mutation of malaria (incorrectly referred to as a virus) which was intended to produce soldiers who could continue to fight even after dying.

While one can argue whether or not the general public's fear of possible military misuses of genetic engineering are well-founded or not, there is no doubt that the possibility of biochemical agents being used either against soldiers or civilians is a very real threat in the twenty-first century. From the use of mustard gas in World War I to napalm in the Vietnam War and Sarin in the war between Iran and Iraq in the 1980s, chemicals have been used to kill, disfigure, and incapacitate both on the battlefield and beyond. But biological warfare is older still, dating back to the Tartars' catapulting of plague-ridden corpses over the city walls into the city of Kaffa in 1346. The plague was also used in biological warfare in World War II, when Japan's Unit 731 dropped canisters containing plague-infected fleas on the Chinese countryside.⁴⁹ In the years since the end of the Cold War, information has slowly come to light concerning the United States and Soviet biological warfare programs, including the possible genetic engineering of bacterial strains which are antibiotic resistant and target specific ethnic groups.⁵⁰ In addition to these artificial biological weapons, the Centre for Disease Control has identified approximately sixty pathogens which have the potential for use in biological warfare, including anthrax, typhoid fever, plague, Ebola, and smallpox.

Any thoughts that biological warfare or bio-terrorism could be prevented in the United States were quashed in the fall of 2001, when anthrax-laden letters killed five people and sickened seventeen others. After a lengthy investigation, the attacks were traced back to a scientist, Dr. Bruce Ivins, who committed suicide before he

⁴⁸ Paoli, Norris, and Gordon, *Re-animator*.

⁴⁹ Committee on Homeland Security, *Engineering Bio-Terror Agents: Lessons From the Offensive U.S. and Russian Biological Weapons Programs* (Washington D.C.: U.S. Government Printing Office, 2005), p.18.

⁵⁰ Committee on Homeland Security, *Engineering Bio-Terror Agents*, p. 22.

could be indicted for the crime. According to the FBI investigation final report, Ivins had access to the specific strain of anthrax used in his job at the Fort Detrick, Maryland bio-defence laboratories, and his motivation was the possible cancellation of his anthrax vaccine program (due to criticism of the vaccines after the Gulf War), exacerbated by reported long-term mental health issues.⁵¹

If a real-life scientist and government employee could “crack” and use biochemical weapons on innocent citizens, it is certainly no surprise that similar scenarios have been dramatised in a number of zombie films. In *The Earth Dies Screaming* (1964), alien robots (rather than human scientists) use chemical warfare to kill the majority of the human race, and reanimate some human corpses in order to terrorise the survivors. The fictional experimental World War II gas Gamma 693 is the cause of a zombie outbreak in *Gamma 693* (1981), and an experimental AIDS vaccine creates a zombie outbreak in *Zombie '90: Extreme Pestilence* (1990). In the Japanese films *Biozombie* (1998) and *Junk* (2000), biochemical warfare agents cause corpses to reanimate, and Umbrella Corporation’s bio-engineered T-virus was the source of the infection in the *Resident Evil* series.

The *Return of the Living Dead* series adds an interesting twist to references of military biochemicals in zombie films. The first movie in the series begins with a written disclaimer that the “events portrayed in this film are all true.”⁵² According to the story recounted by Frank, one of the employees at the Uneeda Medical Supply warehouse, Trioxin was developed by the Darrow Chemical Company for the military, in order to “spray on marijuana or something.”⁵³ The chemical was accidentally spilled at a VA Hospital in Pittsburgh and reanimated corpses in the morgue. According to Frank, *Night of the Living Dead* was a fictionalisation of this actual event, and in order to convince Freddy, his new assistant, of the veracity of the tale, shows him the barrels of Trioxin (and zombies) accidentally shipped to their warehouse, resulting in the accidental release of Trioxin and the start of a new zombie outbreak. *Planet Terror* (2007) plays on widespread stories of Gulf War syndrome (possibly caused by exposure to chemical warfare). A platoon of soldiers stationed in Afghanistan stumbles upon Bin Laden’s hiding place and for some reason is sprayed

⁵¹ “Amerithrax Investigative Summary,” *United States Department of Justice* (19 February 2010), <http://www.justice.gov/amerithrax/docs/amx-investigative-summary.pdf>, accessed 3 January 2011.

⁵² Dan O’Bannon, *The Return of the Living Dead*, directed by Dan O’Bannon (1984; Beverly Hills, CA: Twentieth Century Home Entertainment, 2007), DVD.

⁵³ *Ibid.*

with the chemical DC-2 (known as “Project Terror”). The chemical turns humans into zombies, and the platoon has only managed to remain human by procuring a supply of the chemical from an unscrupulous biochemist who claims that “science comes first, but business comes a close fucking second.”⁵⁴ When the chemical is released, it turns a small town into a zombie hoard, and a doctor examining one of the early victims compares the horrible lesions and other symptoms to those he has previously seen in returning Iraqi veterans. “The shit they spread around there you just wouldn’t believe”, he explains to the concerned patient.⁵⁵ The DuPont Chemical Company may have once promised “Better Things for Better Living ... Through Chemistry”,⁵⁶ but the lesson of numerous zombie films is that chemical discoveries are not always used for the betterment of society.

In the end, zombie media deliver a fresh vision of the classic Frankenstein trope, providing another venue for the creation of cautionary tales against historical and, more importantly, potential future abuses of scientific discoveries. For example, in *Brains: A Zombie Memoir*, zombie and former college professor Jack Barnes explains the ultimate genius of George A. Romero:

His initial trilogy [...] was prescient in the grand tradition of science fiction becoming fact. First you have to imagine a man on the moon, then you can put one there. Imagine an atom-splitting bomb, and then build one. Imagine a virus that turns corpses into the walking dead, and someone, somewhere, will develop the virus.⁵⁷

This is the ultimate lesson of modern science – if something can be imagined by the human mind, some scientist will seek to discover how to make it a reality. Conversely, whatever science can create, some human mind (either fictional or all-too-real) will conceive how to misuse it for personal, financial, or political gain.

The scientific advances of the twentieth century have brought about increased economic prosperity, medical miracles, and forms of leisure and entertainment previously only considered in works of fiction. But with new discoveries come new ethical challenges, and questions as to whether all possibilities in the laboratory must

⁵⁴ Robert Rodriguez, *Planet Terror*, directed by Robert Rodriguez (2007; New York: The Weinstein Company, 2007), DVD.

⁵⁵ Ibid.

⁵⁶ “Better Things...: 1939,” *Dupont*,

http://www2.dupont.com/Heritage/en_US/1939_dupont/1939_indepth.html, accessed 3 January 2011.

⁵⁷ Becker, *Brains*, p.4.

be realised. Zombie films offer us a chance to ponder difficult questions at the intersections of science, technology, and ethics. Kenneth Bainbridge, director of the Trinity atom bomb test, called the test a “foul and awesome display” and later remarked to fellow scientist J. Robert Oppenheimer “Now we are all sons of bitches.”⁵⁸ Other scientists and engineers may have certainly thought the same after seeing the results of their work. For example, Alfred Nobel is widely said to have bequeathed his fortune to set up what became the Nobel Prizes out of a sense of regret over the uses of dynamite and the other explosives he had developed. These geniuses of science ultimately concluded that they had given birth to something truly monstrous. And as in the case of Shelley’s classic tale, one must ask, who is the real monster – the scientist or what he or she creates? Therefore *Day of the Dead*’s Dr. Logan appears to have been correct when he said of zombies, “they are us”, for when we look into the heartless, decaying face of the undead, driven by the unreflecting need to consume (albeit human flesh rather than scientific knowledge), one can ask whether that face is being held up as a mirror into which all of us – especially scientists – must gaze.

⁵⁸ “The Manhattan Project: An Interactive History – The Trinity Test”, *U.S. Department of Energy Office of History and Heritage Resources*, <http://www/cfp/doe.gov/me70/manhattan/trinity.htm>, accessed 3 January 2011.