Environmental Crisis and Images of Desire in Paolo Bacigalupi's *The Windup Girl* and *Pump Six and Other Stories*

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Abstract

In the wake of mounting warnings from ecologists and other scientists, contemporary fiction writers have been alerting their readers to the environmental crisis as manifested in droughts, floods, wildfires, polar ice cap melting, rising sea levels, air, water, and soil pollution, species extinction, and a host of other ills. Within the realm of contemporary science fiction, Paolo Bacigalupi, a highly acclaimed American author, describes a world in the throes of catastrophic ecological change. Through his meticulously crafted narratives, Bacigalupi delivers a prophetic message, delineating environmental crises within the context of a posthuman world.

Employing pertinent concepts derived from object-oriented ecological theory, this paper employs Jane Bennett's notion of "vibrant matter", Timothy Morton's concept of "hyperobjects", Stacy Alaimo's theory of "trans-corporeality", and Rob Nixon's idea of "slow violence" to see how Bacigalupi engages in current discourses on the environmental crisis and images of desire in *The Windup Girl* and *Pump Six and Other Stories*. Bacigalupi presents grotesqueries against a background of multiple, post-apocalyptic disasters. While societal elites indulge in hedonistic experimentation, mega-corporations engage in genetic manipulation on humans, plants, and animals in pursuit of progress, aesthetic trends, profit, or survival. Humanity's ongoing destruction of the planet in service to a consumer culture, along with the disastrous results of attempting scientific "fixes" without understanding the interconnecting causes or the scale of the phenomenon they are trying to "fix", beg the question of whether science and technology will be able to prevent or ameliorate future ecological crises, or inadvertently precipitate even graver predicaments. Bacigalupi's critique, illustrated through grim narratives replete with macabre examples, serves as a poignant exhortation, urging humans to meditate on and then prevent or mitigate the impending disasters of our own making.

Keywords: Paolo Bacigalupi, posthumanism, *The Windup Girl*, *Pump Six and Other Stories*

1. Introduction

In the Anthropocene epoch, an increasing number of scientists affirms human culpability for the contemporary global environmental crisis, characterized by pervasive pollution and escalating climatic upheavals.[1] Environmental issues are a serious concern not only for scientists and activists, but for writers, philosophers, and literary critics as well. Paolo Bacigalupi is one of the most popular and critically acclaimed science fiction authors of the 21st century,[2] renowned for his intellectually stimulating narratives envisioning futuristic world. Notably, *The Windup Girl* has drawn extensive scholarly attention, with critics and scholars scrutinizing multiple aspects of this acclaimed novel.

For the purposes of this paper, two reviews warrant special consideration: one by Scott Selisker (2015), who examines Bacigalupi's (and science fiction's) solution to the "problems of scale" in imagining and portraying both genetically modified organisms (GMOs) and climate change; and the other by Jungyoun Kim (2020), who sees in Emiko, the eponymous windup girl, "the face of genetic modification", and a woman who is treated like a commodity.

[1] In 2002, atmospheric scientist Paul Crutzen writes that human population growth led to environmental problems, such as the rise in methane and carbon dioxide due to the disappearance of tropical rain forests and fossil fuel combustion (23). The effects of human activities "including transformations of the landscape, urbanization, species extinctions, resource extraction and waste dumping, as well as disruption to natural processes such as the nitrogen cycle," on the future of the earth will continue for a long time (Hamilton, et al. 3). In 2020, Emily Elhacham et al. noted that "the anthropogenic mass, which has recently doubled roughly every 20 years, will surpass all global living biomass. On average, for each person on the globe, anthropogenic mass equal to more than his or her bodyweight is produced every week. This quantification of the human enterprise gives a mass-based quantitative and symbolic characterization of the human-induced epoch of the Anthropocene" (Elhacham, et al. 442).

[2] Bacigalupi, who works on the issue-related newspaper *High Country* News, is the winner of the Nebula Award, the Hugo Award, the Locus Award, the John W. Campbell Memorial Award, the Compton Crook Award, and the Michael L. Printz Award.

Beyond examining these scholarly evaluations of *The Windup Girl*, this paper aims to explore both *The Windup Girl* and *Pump Six and Other Stories*[1] by employing object-oriented ecological discourses. This analytical approach offers a new way of interpreting Bacigalupi's works, with object-oriented theory as the interface for ecological exploration of Bacigalupi's texts. Reference to Jane Bennett's concept of vibrant matter, Timothy Morton's notion of hyperobjects, Stacy Alaimo's theory of trans-corporeality, and Rob Nixon's discourse on slow violence demonstrate how humans in these stories try to use science and technology as a bargaining chip to stave off disaster, but instead worsen their ecological and biological predicaments.

1.1 The Windup Girl

Paolo Bacigalupi describes *The Windup Girl* as "bio-punk, or dystopian, or environmental, or science fiction" (2009b, p. 466). Within the narrative, he envisages the results of environmental degradation, which manifest in a deteriorating economy, escalating sea levels, climate change, and a depleted earth. *The Windup Girl* is set two hundred years in the future in Thailand, which has become the only place left with genetically healthy, fertile seeds (unlike the sterile, genehacked seeds sold by megacorporations like AgriGen). Through the strategic closure of its borders, safeguarding and withholding its invaluable seedbank, and fighting off engineered plagues, Thailand has maintained a semblance of security in an uncertain world. Central to upholding this security are the White shirts, the enforcers of the Environment Ministry, led by the revered Captain Jaidee Rojjanasukchai and his adept protege Kanya. Meanwhile Anderson Lake, a spy for AgriGen, is searching for the hidden Thai seedbank and its wealth of genetic knowledge; as a cover he owns a kink-spring factory that Hock Seng, a Chinese refugee from Malaysia, who manages and runs. Lake meets Emiko, an illegal "windup" girl, at the sex club where she works to pay off her owner, and where she has overheard information about the hidden seedbank.

As the principled leader of the White shirts, the "incorruptible" Captain Jaidee steadfastly resists the encroachments of calorie conglomerates. However, Kanya succumbs to the machinations of Akkarat, the chief of the Trade Ministry, who clandestinely negotiates with AgriGen through Lake. Against the backdrop of mounting challenges, including extensive flooding, pervasive political corruption, insatiable corporate greed, and the unforeseen ramifications of technological advancements, Bangkok finds itself on the brink of disaster. The convergence of these crises underscores the irreversible plight of the city, where salvation appears increasingly elusive.

1.2 Pump Six and Other Stories

While *Pump Six and Other Stories* has not garnered the scholarly attention that *The Windup Girl* has, it similarly delves into the thematic concerns in environmental transformation, technological malpractice, and the darker facets of human nature. Within this collection, Bacigalupi portrays a world where the pursuit of immortality leads humans to explore rejuvenation technologies, only to confront the inevitable consequences of overpopulation. Moreover, a desire for an idealized conception of beauty drives individuals to create or embody monstrous entities. In Bacigalupi's dystopian vision, the futuristic world will be full of polluted landscapes, genetically modified crops, mechanized beings like robotic dogs, fluted girls, and windup girls, and rejuvenated, sterile humans—each emblematic of the misappropriation of scientific advancements in the pursuit of survival, economic gain, or personal gratification.

In Bacigalupi's fiction the way humans exploit advanced science and technological "fixes" only worsens the catastrophes resulting from biological changes, ocean changes, and climate change. Examples from the novel include: "Nutrient cultures…A papaya seedstock we don't recognize. A new iteration of U-Tex that probably sterilizes any rice varietal it meets" (2009a, p. 60). These objects or things that Bacigalupi imagines, like the kink-spring factory that is supposed to be a revolutionary new energy source but incubates a plague, or the windup girl herself, "have the potential to become lethal" (2009a, p. 301). They are the integral context of the story, where they possess what new materialist Jane Bennett calls "thing-power". As well, the novel grapples with such issues as climate change, or what Timothy Morton (2010) has termed "hyperobjects" (p. 18), which are so vast in space and time that they are, by definition, difficult to comprehend.

Before turning to the ways in which new materialism can be applied to Bacigalupi's fiction, I shall discuss two reviews of *The Windup Girl* that are relevant here. Scott Selisker and Jungyoun Kim both write about the ways Bacigalupi deals with such imponderables as the far-reaching effects of human technology, from the internal combustion engine with its reliance on fossil fuels and its consequence of climate change, to the use and implications of genetic modification in plants, animals, and humans.

2. Literature Review: Problems of Scale and Women as Food

2.1 Scott Selisker's Review on The Windup Girl

Where Timothy Morton writes about hyperobjects, Scott Selisker tackles "problems of scale" – the difficulty of imagining both the very large, as in the long-range effects of climate change, and the very small, as in the molecular changes in genetically modified organisms. In his 2015 review "'Stutter-Stop Flash-Bulb Strange': GMOs and the Aesthetics of Scale in Paolo Bacigalupi's *The Windup Girl*," Selisker writes that science fiction offers one way to make such phenomena visible and explicable, and that "literature might be able to scale the world's inaccessible phenomena up or down in order to meet the human observer and reader" (2015, p. 501). Science fiction can scale up – as in *The Windup Girl*, which fast forwards by centuries so that readers can imagine the long-term results of fossil fuel use and late-stage capitalism – or down, making the DNA changes in GMOs visible in their results, as in the loss of particular foods like nightshades, or in Emiko's telltale stutter-step. In this latter example, Selisker points out that Bacigalupi uses conventions from other

[1] *Pump Six and Other Stories* is a collection of short stories that Bacigalupi wrote over a period of ten years (1999-2008). It won the Locus Award for Best Collection in 2009 and the Cena Akademie SFFH Award for Book of the Year in 2010.

mediums, and that a stiff or stuttering movement has been a cinematic convention for the automaton from *Metropolis* to *Blade Runner*. But in terms of the aesthetics of disgust usually associated with the "unnatural", such as with Frankenstein's monster, who excites repulsion, the changes that make the GMOs in *The Windup Girl* unnatural are either invisible and result in beauty, as with the rambutan fruit or Emiko's "perfect" skin; or the disgust is turned on its head. What makes Emiko's difference most visible is her stutter step, and the "herky-jerky *heechy-keechy*" that is used against her in the live sex show where she works. Selisker (2015) makes the point that:

> This movement apparently licenses the depraved audience to label her torture comical, "silly," and inconsequential. In depicting such a depraved audience, Bacigalupi's work participates in an aesthetics of disgust, but with a key difference from what is usually encountered with chimerical GMOs: instead of the organism itself provoking disgust, the audience stages a way of looking at another creature, and a larger network of exploitative interactions, that we find disgusting. (p. 512)

In this way, Bacigalupi inspires sympathy and empathy for a character the sex club patrons see as less than human.

2.2 Jungyoun Kim's review on The Windup Girl

Jungyoun Kim (2020), sees Bacigalupi's portrayal of Emiko as conventional and (unwittingly) sexist rather than illuminating or revelatory. In her review, "The Problematic Representations of the Orient, Women, and Food Transformations in Paolo Bacigalupi's *The Windup Girl*," Kim takes issue with Bacigalupi for his use of Orientalist stereotypes, particularly in the case of Emiko.[1] Kim writes that by using the specific Asian tradition of the geisha to frame Emiko, Bacigalupi is enabling "the Western (certainly English-speaking) voyeuristic gaze" (2020, p. 572) and its sexual fantasies about Asian women instead of criticizing such fantasies as he may have hoped to do. She attributes Bacigalupi's problematic stereotypes to the cultural hegemony of the West over the East, noting that while Anderson Lake, a corporate spy for AgriGen, is called a "grubby *farang* [foreigner] trying to make a buck", the novel "mostly follows Lake's perspective", which is colonial, racist, and sexist, and that Bacigalupi fails to undermine this perspective. Kim does note that Anderson Lake is the name of an artificial lake in California, and that Bacigalupi's use of the name marks Lake as a phony, but she seems to see Bacigalupi's portrayal of Lake as both a dominant and a sympathetic character. In my reading, Lake is only one of five point-of-view characters, and Bacigalupi's presentation does him no favors.[2] Kim – and, I would argue, Bacigalupi – presents Lake's relationship to Emiko as "nothing other than a sexual fantasy of possession and rape" (p. 574).

But Kim (2020) goes beyond the Emiko-Lake relationship to position Emiko as "the human face of genetic modification" (p. 573), making the connection between Emiko and GMO food, both plant and animal. Like "genetically engineered livestock she is genetically docile with marketable flesh"; and, as food, Emiko is "an object that can be dismembered, butchered, used, and consumed" (p. 575). Kim illustrates the metaphor of women as food, and as a commodity, by citing the case of Japanese nyotaimori, in which "sushi and sashimi are served on a naked woman who functions as a plate" (p. 575). She notes that, like genetically modified food, Emiko has been created to be sterile because her "body takes meaning only to that degree that it suits men's needs" (p. 578). But what Kim does not say is that, at the end of the book, the windup woman goes far beyond what her male creators have envisioned for her. Where Kim sees Emiko as "a narrative repository of age-old stereotypes of Asia and its women" (p. 579) and a personification of geisha "passivity", Selisker sees Emiko as "the being who was supposed to be programmed, controlled, and owned [who] becomes the most unpredictable force in the city" (p. 513). At the end of the book, Emiko's actions bring down a government and ignite civil war.

By way of the genetically modified Emiko's unpredictability, then, Selisker argues that Bacigalupi's novel asks the question: "What will be the long-term ecological impact . . . of the GMOs we are currently creating?" (p. 514). New materialism asks that question as well.

2.3 Other Recent Critics' Reviews on The Windup Girl

Young-hyun Lee (2019/2020) asserts that GMO technologies with "unknown dangers" result in "humankind's downfall" (p. 584) and have a great impact on human beings in *The Windup Girl*. Priyadharshini and Patchainayagi (2022) analyzes the "[a]rtificial Intelligence, bioterrorism, corporate culture, and its impact on people and society" (p. 2048). Heather I. Sullivan (2022) explores how "plants infect human bodies" (p. 342) from the ecological perspective. Simon C. Estok (2023) discusses the problems which Bacigalupi displays in *The Windup Girl* on "[e]strangement, food, technology, militarization, race, gender, and environment" (p. 616). While *The Windup Girl* garners considerable attention from critics, *Pump Six and Other Stories* by Bacigalupi receives comparatively less scholarly examination. Nevertheless, Bacigalupi's portrayal of humanity's ecological footprint and the intricate dynamics between human and non-human entities in his fictional universe remains a central focus. Additionally, scholars within the new materialist framework prioritize these thematic concerns.

[1] Kim applies Edward Said's concept of Orientalism to discuss the way Western hegemony over the East plays out in *The Windup Girl*. According to Kim, Bacigalupi uses stereotypes that present Bangkok as exotic and corrupt, the Japanese as obedient, the Chinese refugee Hock Seng and the native Thai as cunning, etc. While I concede Kim's point in terms of Hock Seng (who does seem two dimensional), both Kanya and Jaidee (and his ghost, or Kanya's conscience) are compelling and sympathetic characters, as is Emiko; and all of them go beyond stereotype.

[2] For instance, when Lake's attraction to Emiko goes against his self-interest, he wonders if her pheromones were genetically enhanced to attract – a futuristic version of the kind of misogyny that blames rape on the way a woman looks, or in this case, how she smells. At any rate, Lake's "feeling" for Emiko does not prevent him from exploiting her, too. He *is* a grubby foreigner, and the only thing that might redeem him is that he (finally) acts against self-interest, hiding Emiko when she is on the run.

3. Method

New materialists emphasize the power of the non-human, and the interrelationship between the human and non-human world, particularly in effects on the environment.[1] Jane Bennett's concept of vibrant matter, Timothy Morton's notion of hyperobjects, Stacy Alaimo's theory of trans-corporeality, and Rob Nixon's discourse on slow violence all can be applied to Bacigalupi's fictional worlds.

Instead of framing the human-thing relationship within the confines of anthropocentrism or other human-centric paradigms, Bennett (2010) proposes that ecologically sustainable development is based on becoming aware of the interrelationship between humans and non-human entities. Bennett has introduced the concept that all matter has agency in her book *Vibrant Matter*, a groundbreaking contemporary work of vital materialism. Contrary to the traditional view of objects as passive, Bennett argues that they actively influence humans, and vice versa, thereby shaping their reciprocal relationship. As vital material objects, things inherently have the agency to act and interact with other material things, including humans. Bennett employs the Chinese concept of *shi* to elucidate the agentic potential of things: as the flow of matter affects another material object, the interaction between the two creates a new, hybrid object. This notion of interobjectivity, or interaction and effect between objects, also produces what Stacy Alaimo (2015) calls the trans-corporeality effect between human and non-human entities, the interconnectedness and interchange between humanity and the rest of the world, from the air we breathe and the food we eat to the microorganisms that inhabit our bodies.[2]

In Bennett's vital materialist perspective, new materialism accentuates material agency and interobjectivity, both being closely related to the concept of non-anthropocentric posthumanism, which is "the product of hybridization with the non-human (environment, animals and techniques)" (Maestrutti, 2011, p. 51). Bennett contends that non-human objects are active participants, not passive and inert. The non-human are also actors, or what Bruno Latour calls "actants": "an actant...is something that acts or to which activity is granted by another…an actant can literally be anything provided ...it is granted to be the source of action" (Latour, 1996, p. 373). Thus, the relationship between human and non-human is not one of active and passive, but of interaction.

Stacy Alaimo (2015), writing about toxic interactions between the human and non-human world, asserted that humans "can now be considered an elemental as well as a geological force" (p. 299). In recent years human beings have affected the environment to an alarming degree, resulting not only in disastrous changes in the human environment, but in the extinction of other species. It is crucial, therefore, to consider what the future will bring as a result of human behavior, and to calculate the effects of what Timothy Morton (2010) has named "hyperobjects" like climate change so as to avoid ecological disaster. In addition, Morton discusses the problems of GMOs, writing in *The Ecological Thought* that "what's wrong about genetic engineering is that it turns life forms into private property to enrich huge corporations" (p. 86). At the same time, humans have been able to ignore their impact on the earth because the effects occur over such a long period of time, in what Rob Nixon (2011) denotes as "slow violence". Slow violence "occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all" (p. 2). Invisible slow violence includes "[c]limate change, the thawing cryosphere, toxic drift, biomagnification, deforestation, the radioactive aftermaths of wars, acidifying oceans, and a host of other slowly unfolding environmental catastrophes" (Nixon, 2011, p. 2). These disasters often last for generations and cause continuous trauma, to humans and other creatures as well as to the earth itself.

This is the toxic aspect of the "vibrancy" and agency of all matter, and of the interrelationship between humans and non-humans. Posthumanist aspirations envisage human evolution to enable adaptation and survival in a dynamic world. However, the efficacy of such post-humanist aspirations and remedies in fostering a much better future remains uncertain. Bacigalupi's fiction provides insights into these inquiries, offering readers a glimpse into a future that is an extension of the present reality.

4. Discussion

4.1 Images of Desire in Bacigalupi's Fictional World

For proponents of posthumanism the boundary between human and non-human, whether human and machine or human and animal, begins to blur as the organism becomes hybridized, trying to achieve an ideal. This pursuit not only reflects humanity's enduring discontent with its inherent limitations but also illuminates the exploration of desire in Bacigalupi's fiction. While conventional narratives often portray the desire for immortality with a sense of irony and eventual disillusionment, Bacigalupi's narratives, even those depicting the grim consequences of immortality, extend this irony to other human desires. As we shall see, the desire for "perfect" beauty in oneself or another, combined with the need to own or possess, leads to the creation and enslavement of creatures like the windup girl.

The most obvious innovation in Bacigalupi's images of desire is that his idea of the posthuman crosses the border between human and

[1] New materialism has been defined as "an interdisciplinary, theoretical, and politically committed field of inquiry . . . emerging from the front lines of feminism, philosophy, science studies, and cultural theory," and "cross-fertilized by both the human and natural sciences." See: https://www.oxfordbibliographies.com/view/document/obo-9780190221911/obo-9780190221911-0016.xml

[2] To give one example of trans-corporeality: when the human body, which is also a material thing with agency, interacts with a virus, illness can result. This interaction between two material things may also give rise to a third thing; the most obvious example right now being the COVID-19 pandemic, which itself has mutated and hybridized in the months it has circled the globe, interacting with multiple material agents, both human and non-human.

machine, and human and animal. In "The People of Sand and Slag" human biochemistry has been altered by technology to allow survival in a world where the source of nutrition is "a handful of tailings mud" (Bacigalupi, 2008, p. 56). Conversely, Emiko embodies a being engineered to satisfy human desires, serving as a sentient sexual object. The scientist Gibbons speculates that Emiko's genetic makeup might include traits from friendly and docile canine breeds like the Labrador retriever to keep her compliant to the will of a master. As noted by Kim (2020), Emiko is metaphorically equated with food, perceived as "*a piece of meat that can be dismembered, consumed, and discarded*" (p. 575).

In *The Windup Girl*, Bacigalupi's genetic transformations extend not only to "generipped" crops, but also to animals – cats, dogs, wooly mammoths, and even butterflies are remade to fit human needs. Like Emiko, they are all called windup creatures, and they are all objects of scorn. The deputy Kanya, of the environmental police of Bangkok, says: "You are all unnatural. You are all grown in test tubes. You all go against niche. You all have no souls and have no karma" (Bacigalupi, 2009a, p. 328).

There may be some envy in Kanya's diatribe; windup creatures might be soulless, but they are beautiful in a world that values beauty, they are ageless in a world that values youth, and some of them – like Emiko – are resistant to the plagues that beset humanity. The windup creatures are genetically modified to be almost flawless, and in the case of the Cheshire cats that "[fade] in and out of view as their bodies take on the colors of their surroundings" (Bacigalupi, 2009a, p. 30), and who were supposedly created as a child's birthday party favors, this leads to disaster:

> The child guests took their new pets [cats] home where they mated with natural felines, and within twenty years, the devil cats were on every continent and Felis domesticus was gone from the face of the world, replaced by a genetic string that bred true ninety-eight percent of the time. (Bacigalupi, 2009a, p. 30)

This particular disaster may be another reason why human windups like Emiko were made to be sterile; the rest of humanity may well fear that these perfectly beautiful, healthy, strong, less-than-human creatures will replace them. Perhaps as another safety measure, Emiko's built-in stutter-step makes her instantly recognizable as a windup, and puts her in constant danger whenever she goes into the streets of Bangkok. In the case of generipped crops, the AgriGen seeds that have been created in a lab to grow disease-resistant crops are also sterile by design, to assure the company of future sales, but they may infect and sterilize formerly fertile seeds.

Thus, in Bacigalupi's version of the posthuman world, the pursuit of "perfection" and/or profit yields unforeseen and often calamitous repercussions. Furthermore, as we shall see, the quest to appease a jaded palate engenders acts of sadism and the creation of enslaved bodies tailored to fulfill a master's desires. The human body is transformed to fit the landscape of desire, science and technology are pushed to such an extreme that the resultant entities transcend humanity and enter the realm of transhumanism. While transhumanism ostensibly aims "to greatly enhance human intellectual, physical, and psychological capacities" (Bostrom, as cited in Cruz, 2018, p. 159) through universally accessible technology, Bacigalupi's narratives often depict the "enhancements" embraced by transhumanism as grotesque and horrifying.

4.1.1 *Transhuman Bodies*

In "The Fluted Girl" of *Pump Six and Other Stories*, two young girls undergo surgical and chemical transformation to "improve" their appearance and their musical skills, but also to turn them into instruments, in order to make money for their "patron" and owner, Madame Belari:

> Of their original features, little remained. Belari had watched them grow in the castle for two years and then the pills began. Revitia treatments at thirteen froze their features in the matrix of youth…pigment drugs drained color from their skins, leaving them Kabuki pale, ethereal shadows of their former mountain sun-blushed selves, and then the surgeries began. (Bacigalupi, 2008, p. 34-35)

Belari reinvents the fluted girls Lidia and Nia as flutes, with rows of holes in their arms:

> Each note isn't simply affected by the placement of fingers on keys; but also by how they press against one another, or the floor; if an arm is bent or if it is straightened. We froze their hormone levels so that they wouldn't grow, and then we began designing their instruments. It takes an enormous amount of skill for them to play and to dance. (Bacigalupi, 2008, p. 42-43)

The girls undergo a grotesque grooming as their bodies are turned into living flutes and they are taught to play upon themselves. At the same time, they are injected with rejuvenation serum to keep their bodies at the age of 13 forever. Their strange performances excite the jaded appetites of their audience:

> The girls' musical graftings shone: cobalt boreholes in their spines, glinting stops and keys made of brass and ivory that ran along their fluted frames and contained a hundred possible instruments within the structure of their bodies…The spectators pressed closer, incited by the spectacle of naked youth and music intertwined. (Bacigalupi, 2008, p. 41)

The fluted girls also provide Madame Belari's guests with the spectacle of enslaved material objects.

In the colonial era whites enslaved blacks; Bacigalupi extrapolates a future scenario in which reinvented human beings have become another kind of slave. The fluted girls, if they attempt to conceal themselves, remain susceptible to detection and subsequent punishment by their mistress, illustrating another instance of the distortion inflicted upon the enslaved body. Madame Belari exhibits a callous disregard for the well-being of the fluted girls, solely prioritizing the material benefits of owning the fluted girls. In a parallel to the

antebellum South in the U.S., the windup girl Emiko dreams of escaping to the North (of Thailand), where she has heard that there is a place where "New People" like herself live together in freedom. Emiko's intent to procure her freedom by fulfilling her contractual obligations as an indentured servant, rather than as a conventional slave, is less significant than the fact that she was custom-made, akin to a garment, and subsequently discarded when her former owner grew weary of her and sought a replacement model. Through the portrayal of the master/mistress characters, Bacigalupi not only exposes their immorality but also underscores their misogyny. Within them, Bacigalupi discerns the ruthlessness behind the pursuit of desire and/or profit, alongside the concurrent erosion of human empathy, a phenomenon intrinsically linked to environmental degradation.

The rejuvenation drug the fluted girls are injected with is another material that Jane Bennett might describe as vibrant matter. It has agency, and engages in trans-corporeality with the fluted girls' bodies, making them immortal. It also causes pain, while their numerous surgeries have made them vulnerable to fractures. In this way their bodies have been subjected to "slow violence", the term that scholar Rob Nixon coined in his postcolonial discourse. The perfectly preserved beauty of the fluted girls, along with their ability to make music, is the product of slow violence in service to a brutal materialism; it is imposed on slaves who make money for their mistress/owner, as Belari's super stars and her cash cow. Ironically, Madame Belari was herself made into a super star by Vernon:

> Her face was mathematically sculpted into beauty, structured by focus-groups and cosmetic traditions that stretched back generations. Cocktails of disease prophylaxis, cell-scouring cancer inhibitors, and Revitia kept Belari's physical appearance at twenty-eight, much as Lidia's own Revitia treatments kept her frozen in the first throes of adolescence. (Bacigalupi, 2008, p. 30)

Instead of feeling empathy, Belari transforms (and abuses) the fluted girls as Vernon transformed and abused her, and for the same reason – to make money. Reinvented to portray "perfect" beauty, targets for hedonistic and misogynistic violence, the fluted girls exist only as desired sexual objects. The chronic slow violence of Revitia indefinitely prolongs their life, and thus their enslavement. In the case of Emiko, who was created with animal genes that would predispose her to accept abuse, the slow violence began even before she was born.

As well as wanting to possess a beautiful "toy", humans often wish to enhance their own beauty. In Bacigalupi's fiction such "enhancements" are pushed to new extremes even more gruesome than the bound feet of Chinese women or the whalebone corsets of the Victorians. In "The People of Sand and Slag", the narrator and Jaak help Lisa with her new "cosmetic" operation:

> After dinner we sat around and sharpened Lisa's skin, implanting blades along her limbs so that she was like a razor from all directions…Lisa had a DermDecora kit for the sharpening. She'd bought it last time we'd gone on vacation and spent extra to get it, instead of getting one of the cheap knock-offs that were cropping up. We worked on cutting her skin down to the bone and setting the blades…Lisa had done my glowspine, a sweet tracery of lime landing lights that ran from my tailbone to the base of my skull, so I didn't mind helping her out …. (Bacigalupi, 2008, p. 54)

Bacigalupi intensifies the images of hedonistic absurdity, racism, and sadistic slow violence in *The Windup Girl*. Emiko, as a genetically modified human, has endured enslavement since her birth. As a windup girl abandoned by her owner, she exists at the lowest level of a hierarchical society. While her master, Gendo-sama, in Japan, perceives her as "more than human" and laments the lack of respect afforded to "New People" (an alternative term for windups), the reality is that they are hated, and Gendo-sama himself callously discards Emiko. Without a patron, Emiko faces the constant threat of mob violence or scrutiny by the White shirts, which could result in her demise if her windup status is exposed. Additionally, her restricted mobility, constrained to a telltale stutter-step characteristic of windups, renders her perpetually vulnerable. As depicted in "Yellow Card Man," Emiko is designed to serve as the perfect slave for human pleasure:

> Her herky-jerky gait announces her as a creature not human, no matter how beautiful she may be. No matter how intelligent, no matter how strong, no matter how supple her skin, she is a windup and meant to serve – and marked as such by a genetic specification that betrays her with every unnatural step. (Bacigalupi, 2008, p. 190)

In the sex club where she works, which is the one place where she is known as a windup, instead of being safe she is abused for the same reason. Although she exists to serve, Emiko still feels shamed by her performances. Kannika tells the audience that Emiko was a rich man's plaything in Japan and now she is their plaything in Thailand, and then goes on to enact sadistic violence on Emiko:

> Kannika drags her further back, bending her like a willow, forcing her to thrust her breasts out to the crowd, to arch further still, to spread her thighs as she struggles not to topple sideways. Her head touches the teak of the stage. Her body forms a perfect arc. Kannika says something and the crowd laughs. The pain in Emiko's back and neck is extreme. She can feel the crowd's eyes on her, a physical thing, molesting her. She is utterly exposed…Everyone is laughing…In Japan she was a wonder. Here, she is nothing but a windup. (Bacigalupi, 2009a, p. 42-43)

Emiko endures the humiliation and sexual abuse partly because she was made to be compliant, and partly because this job is her only way to survive – she needs to pay back the sex club owner who currently has her contract – but also because the sex club owner has promised to tell her the location of the place in the North where New People like herself live together as free people. This vision of freedom, and Emiko's yearning for it, give her the hope that fuels her survival, despite her daily struggles and her outcast status.

The sexual sadism in the above is not the only kind of cruelty that results when humans push the gratification of their desires to the limit. In "Pop Squad" Bacigalupi shows the cruelty – and the death wish – inherent in the yearning for immortality. In "Pop Squad" everyone

takes "rejoo", an affordable rejuvenation medicine that brings them immortality; but to prevent overpopulation and keep humanity from over-running the earth, women are not allowed to give birth. The narrator of the story is an agent whose job is to kill any illegally born baby. When he discovers one, he tells the mother that she has made an insane sacrifice: she not only had to stop taking "rejoo" (and find a sperm donor willing to do the same) to get pregnant, she has to hide the baby. And if the baby manages to grow up, they will need an ID card, which they won't have, to get their own dose of rejoo. In this macabre reflection on the contemporary abortion debates raging in many Western countries, the question of whether or not it is moral to have an abortion, and at what stage it can be terminated, is reframed: the innocent infant, already born, is subsequently terminated; the baby's mother has given up immortality herself and become an outcast. At the end of the story, the narrator/agent decides not to kill the mother and the baby; Bacigalupi implies that bodily immortality holds little significance in comparison to the inherent value of life itself.

In addition to these posthuman products with different bodily appearances via the application of technology, Bacigalupi also shows the possibility of deforming the body to make it devoid of organs. Just as Hans Moravec envisioned, humans can download their consciousness into the computer where humans can live in disembodiment. N. Katherine Hayles (1999) likewise states: "the body can be dematerialized into an informational pattern and rematerialized, without change, at a remote location" (p. 1). In "Pocketful of Dharma," Humans may be saved in the storage space and the original person compressed into a cube that can be put into a trouser pocket. Even the soul of Naed Delhi, the nineteenth Dalai Lama, has been locked in a computer program: "You are an artificial intelligence construct. Your consciousness is software. Your input comes from hardware. They are incompatible on the system we have installed you in" (Bacigalupi, 2008, p. 14). In Gilles Deleuze and Felix Guattari's (1983) reconception of the human body, "[t]he body is the body/it is all by itself/and has no need of organs/the body is never an organism/organisms are the enemies of the body" (p. 9). They assert that "body without organs is not a dead body but a living body all the more alive and teeming once it has blown apart the organism and its organization" (Deleuze and Guattari, 1987, p. 30). Therefore, the body without organs is in a "nonproductive stasis" (Deleuze and Guattari, 1983, p. 9). From this point of view, the concept of the "human" as traditional subject has collapsed and becomes open to the objects in its surround, the concept of an abstract material object in the "post-human" situation. In other words, a person is nothing more than a "desired machine," a combination of invisible organ perception projections and a tangible "body without organs." This concept is similar to Hayles's "disembodiment" which claims that the body is only a secondary addition to life. What matters is not the physical body, but the abstract code or information model. Deleuze and Guattari (1987) accentuate that "BwO is the field of immanence of desire, the plane of consistency specific to desire (with desire defined as a process of production without reference to any exterior agency, whether it be a lack that hollows it out or a pleasure that fills it)" (p. 154). In the posthuman condition, the information code replaces the human body. Deleuze and Hayles' discourses on body are illustrated vividly in Bacigalupi's story about the Dalai Lama.

With such chilling examples, Bacigalupi presents a negative aesthetic, one that inspires abhorrence**.** As Selisker points out (see above), Bacigalupi portrays "unnatural" GMOs as beautiful and/or sympathetic in *The Windup Girl*. But in *Pump Six and Other Stories*, most of his transhuman "enhancements" are repulsive. In all of his fiction, however, the hierarchies and inequities of the present world persist, as do misogyny and racism, and they depict a negative aesthetic – they are profoundly ugly. The fluted girls, the windup girl, and the immigrant yellow card man all exist on the fringes of society. The women live in slavery. In this hierarchy animals are also enslaved, in that they are seen as existing only to serve the needs of human beings, like Priti and Bidi in "The Calorie Man":

> The massive creatures barely resembled the elephants that had once provided their template DNA. Generippers had honed them to a perfect balance of musculature and hunger for a single purpose: to inhale calories and do terrible labors without complaint. The smell of them was overwhelming. Their trunks dragged the ground. (Bacigalupi, 2008, p. 102)

While the megadonts are bred for labor, other creatures are genetically manipulated to appeal to a market, to those who can afford to indulge their curiosity or their appetites. In a chilling reflection of planned obsolescence, Cheshire cats and windup girls are disposed of when they go out of fashion – thrown out onto the streets like trash. But instead of expiring politely, they survive, disrupting the social order. The Cheshire cats even manage to thrive, and as thriving outliers are renamed "devil cats", and hated as much as Emiko is. Despite being bred to be nothing more than toys, Bacigalupi's transformed bodies are well able to act on their own.

4.1.2 Agentic Bodies

While Bacigalupi's "toys" are not just passive objects, but have agency in new materialism. Nature also has agency:

> Nature is agentic—it acts, and those actions have consequences for both the human and nonhuman world. We need ways of understanding the agency, significance, and ongoing transformative power of the world—ways that account for myriad "intra-actions" (in Karen Barad's terms) between phenomena that are material, discursive, human, more-than-human, corporeal, and technological. (Alaimo & Hekman, 2008, p. 5)

Jane Bennett accentuates the significance of vital matter and thing-power from a non-anthropocentric standpoint. For instance, the flood at the end of *The Windup Girl* and the malfunctioning pump six in the story "Pump Six" exemplify the power of things. The thing-power can affect human life. Similarly, human actions exert a profound influence on our environmental ecology. Climate change partly stems from human destruction to the natural environment. Climate itself also serves as a manifestation of vital matter, intricately intertwined with human activities. As a way to study such phenomena in novels like Bacigalupi's, Timothy Morton (2010) invented the concept of

hyperobjects.[1] He describes hyperobjects as follows: they are "viscous" or sticky (like plutonium, plastic, or capitalism; they are omnipresent); they are not local but transnational; their scale is so vast in time and space that humans cannot fully comprehend them; and they are created by interactions between objects (Morton, 2010, p. 1).

Climate change and its attending ills are a dramatic example of a hyperobject. In *The Windup Girl* and *Pump Six and Other Stories*, climate change feels "sticky", in that it cannot be undone or escaped from; it is universal and transnational; and it is the result of human-induced causes, but also barely understood interactions between human and nonhuman objects like the sun, fossil fuels, and methane gas, and result in unforeseen effects:

> The plagues were but the latest insult to the Kingdom's survival. First came the rising sea levels, the need to construct the dikes and levees. And then came the oversight of power contracts and trading in pollution credits and climate infractions. The White shirts took over the licensing of methane capture and production. Then there was the monitoring of fishery health and toxin accumulations in the Kingdom's final bastion of calorie support (a blessing that the *farang* calorie companies thought as landlocked people and had only desultorily attacked fishing stocks.). And there was the tracking of human health and viruses and bacteria: H7V9; cibiscoscosis 111.b,c d; *fa' gan* fringe; bitter water mussels, and their viral mutations that jumped so easily from saltwater to dry land; blister rust…There was no end to the duties of the Ministry. (Bacigalupi, 2009a, p. 134)

In the above Bacigalupi not only portrays the climate change resulting from human impacts on the environment, but the viruses and bacteria, the mutations, the thing-power interactions that result in new agentic bodies.

In *The Windup Girl* what is left of civilization is caught in a feedback loop of environmental destruction and climate change. Captain Jaidee of the Thai Environment Ministry (the White shirts) describes the human diseases in terms of the ocean that threatens to drown Bangkok: "Protecting the Kingdom from all the infections of the natural world is like trying to catch the ocean with a net. One can snare a certain number of fish, sure, but the ocean is always there, surging through" (Bacigalupi, 2009a, p. 54). Bangkok is surrounded by levees, and Thais, with the help of "ciak-burning pumps and leveed labor and a deep faith in the visionary leadership of their Chakri Dynasty…have so far kept at bay that thing which has swallowed New York and Rangoon, Mumbai and New Orleans" (Bacigalupi, 2009a, p. 8). Bangkok has become one of the last coastal cities above sea level, and, due to the efforts of Jaidee and the Environment Ministry, one of the last relatively healthy locales, but it, too, is in danger of being poisoned and submerged.

Morton's discourse on hyperobjects offers another way to look at Bacigalupi's agentic bodies – the most obvious in the above being the rising ocean and the global warming that caused it. The diseases and plagues that attack crops and humans also signify the interobjectivity of hyperobjects, since both humans and non-humans interact to create them. The hybridization – or third thing that gets created as a result of the interaction – also indicates trans-corporeality, the movement and flow between various forms of matter. In this case trans-corporeality has led to slow violence when human bodies, as well as the environment, are subjected to environmental toxins.

4.1.3 Toxic Bodies

Nixon's concept of slow violence applies to environmental catastrophe as well as human bodies. Human changes to the environment may not appear as immediate and obvious injury, but only reveal their damage over time, in a kind of chronic violence of deterioration. Nixon (2011) mentions environmental disasters such as poison accumulation, transfer, and amplification; deforestation; nuclear radiation; ocean acidification, and so on, all of which cause long-term instead of immediate effects, and thus may be overlooked. Yet these disasters will damage humans as well as the environment. Bacigalupi portrays trans-corporeality as people and the environment interact in a future world; since he posits this as an extension of our present world, humanity's attempts to survive continue to worsen the toxic effects of their interventions.

In *The Windup Girl*, diseases attack humans and crops. The disease-resistant crops are controlled by foreign companies, and have become a bargaining chip for government officials. Anderson Lake, working for AgriGen, tells Somdet Chaopray a, regent to the young Thai queen, that his company offers "next iteration of U-Tex rice" and "the grain before it is rendered sterile" which makes it resistant to the ubiquitous blister rust. The technological products of AgriGen are tempting. The Environmental Ministry has lost its leader and best hope, Captain Jaidee, the Tiger of Bangkok, while climate change is an omnipresent threat: "The dry season never ends. Will the monsoon even come this year?...with the climate so much altered, even the Environment Ministry's own modelling computers are unsure of the monsoon from year to year" (Bacigalupi, 2009a, p. 260). Meanwhile, the Environment Ministry is trying to find a way to safely bury the people dead from disease, and protect the remaining clean water sources in Thailand.

At this point in the novel, the trans-corporeal relationship or interplay of agency between the "porous bodies" of humans, plants, animals,

1 Hyperobjects contain five characteristics. These hyperobjects contain (1) "Viscous": The Lago Agrio oil field in Ecuador, the biosphere, the Solar System, nuclear materials, plutonium, Styrofoam, plastic bags, capitalism, and global warming can all be regarded as hyperobjects (*Hyperobjects* 1). (2) "Nonlocal" (*Hyperobjects*1). With this characteristic, Morton opposes "locality" emphasized by the ecological discourse because locality ignores global problems, and many interactions among objects. They are in Deleuze's terms, so-called "machinic assemblages" (qtd. in Tsai 138). (3) "Temporal undulation" (*Hyperobjects* 24): "some very large hyperobjects, such as planets, have genuinely Gusian temporality: they generate spacetime vortices, due to general relativity" (*Hyperobjects* 1). Hyperobjects are closely associated with "different temporalities than the human-scale ones" (*Hyperobjects* 1). (4) "High-dimensional phase space" (Hyperobjects 1): People cannot fully see the whole picture of the non-human world. (5) "Interobjectivity" between objects.

and the rest of the environment has not only degraded the environment, but has created cross-body problems between humans and non-humans, and is about to wreak havoc on Bangkok. Trans-corporeality "opens up a mobile space that acknowledges the often unpredictable and unwanted actions of human bodies, nonhuman creatures, ecological systems, chemical agents, and other actors" (Alaimo, 2010, p. 2). But since the phenomena of corporeality proceed at very slow pace, the people of Thailand have been able to ignore their effects, until, like extreme weather or the pandemic, they are impossible to ignore.

In Bacigalupi's worlds, trans-corporeality and slow violence are pushed to an extreme. One of Bacigalupi's most macabre examples is found in "Small Offerings," where humans sacrifice their first child, since the first child bears "the chemical load of its mother down to incineration" as "a vessel for contaminants", and to "scour the fat cells of a woman who sits at the top of a poisoned food chain, and who wants to have a baby".[1] In the story people carry too many toxins from living with environmental pollution. In the narrative, the initial infant serves as a "small offering," facilitating the purification of the mother's body to enable the conception of a subsequent, healthy child. The sacrificial act of the first baby serves as a stark admonition, forewarning that forthcoming generations will inevitably bear the burden of the environmental degradation engendered by contemporary human actions. Functioning as a scapegoat, the infant not only symbolically but also literally assumes the burden of environmental toxicity and pollutants generated by human activity within its body.

5. Conclusion

Most scientists agree on humanity's ongoing destruction of the environment. Reflecting this point of view, Bacigalupi's fiction extrapolates a future characterized by post-apocalyptic calamities stemming from bioengineering, environmental pollution, plague, climate change, flooding, and famine. As well as these disasters, human slavery continues at the behest of hedonistic elites, who perpetrate slow violence on genetically modified humans and animals because of their desire to possess a creature with "perfect" physical beauty, or simply to own something new, to satisfy their curiosity, or to excite their deadened senses. Bacigalupi unveils the corruption in the Anthropocene, and warns of worse to come if humanity cannot find a better way forward. Therefore, environmental awareness is the necessary first step toward a livable future. As to the way that human beings participate in trans-corporeality, Alaimo (2010) contends that "by attending to the material interconnections between the human and the more-than-human world, it may be possible to conjure an ethics lurking in an idiomatic definition of matter" (p. 2).

Bacigalupi's science fiction, which highlights environmental crisis in a posthuman future, provokes readers to take responsibility for that future. The destruction of the natural world that began with humans may well put an end to all human life and the planet itself unless we change "civilization" as we know it. That such a change would bring a new beginning is the hope, and Bacigalupi writes to that hope. Each story in *Pump Six and Other Stories* offers an open ending, one that provides readers with imaginative space, as does the ending of *The Windup Girl*, where the space to imagine hope includes both the natural, still fertile seedbank and the "unnatural" windup girl.

At the end of the novel Kanya turns on the AgriGen reps who want to buy Thailand's seeds for their own financial gain, and the seedbank is taken away to be hidden and kept safe from the megacorporations. Meanwhile, Emiko undergoes an unforeseen transformation, evolving into an autonomous entity beyond the scope of her creators' intentions. Under the pressure of continual abuse, her "good dog" finally went feral. The stutter step that marked her as a slave, as something less than human, transformed into a speed and strength that allowed her to destroy her persecutors and escape. She nurses Lake as he dies of the plague she is immune to, while around her the waters rise – bringing with them the rogue scientist Gibbons, who can get rid of the gene that made her passive, and the one that made her sterile, in order to create more New People. Like Thailand's hidden seeds, Emiko embodies the essence of hope for the future. Her relentless pursuit of a life beyond mere survival—her quest for freedom—mirrors the fervent determination of the Thai Environment Ministry to safeguard their seeds from genetic manipulation, albeit temporarily achieved.

In the epilogue of *The Windup Girl* there is the sound of pumps: "The destroyed locks and sabotaged pumps take six days to kill the City of Divine Beings. Emiko watches from the balcony of the finest apartment tower in Bangkok as water rushes in" (Bacigalupi, 2009a, p. 382). The end of "Pump Six" of *Pump Six and Other Stories* features the same sound: "Not far away, deep underground, nine pumps were chugging away; their little flashers winking in and out with errors, their maintenance logs scrolling repair requests, and all of them running a little harder now that Pump Six was down. But they were still running" (Bacigalupi, 2008, p. 239). The sound of pumps and sea water reverberates like a heartbeat through the ending of both stories.

In Bacigalupi's fiction a reader may hear another sound, one that philosopher and cultural theorist Mladen Dolar has described as

> . . . a pure call, which is not sonorous, not commanding anything, a mere convocation and provocation, the call to an opening to Being, to get out of the closure of one's self-presence. And the notion of responsibility—ethical, moral responsibility—is precisely a response to this call—it is impossible not to respond to this call; by evading it one evades one's fundamental responsibility, and one is always called upon. The very notion of responsibility has the voice at its core; it is a response to a voice. (2006, p. 95)

At the end of Bacigalupi's stories, it is possible to hear that call.

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