

Biogenetics, The Nation, and Globalization in Paolo Bacigalupi's Critical Dystopias

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Abstract:

This essay explores the Utopian political possibilities of biogenetic seed production through a reading of two critical dystopian works by Paolo Bacigalupi: *The Windup Girl* and "The Calorie Man." These texts are set in a dystopian future in which food production is completely controlled by a handful of global corporations who have successfully genetically engineered seeds to be unfertile. While extrapolating tendencies of the present overlap between neoliberal global capital and the development of patented genetically modified (GM) food production, Bacigalupi's work also reveals fissures between the nation-state and global capitalism in the latter's quest for unfettered circulation of profits. This essay tracks Bacigalupi's representation of biogenetics across time and space, exploring how seeds and other genetic material can become a terrain of struggle between nation states and multinational capital and not simply a commodity through which value flows from the nation to global corporations. This essay argues that Bacigalupi's work educates our desire for an alternative to the current configuration of biogenetic engineering—not in the service of a nostalgic rejection of bioengineering, but instead a future-oriented transformation of the conditions in which bioengineering is used and a movement toward a utopian future.

Keywords: biogenetics, critical dystopia, globalization, bioengineering, transformation

Following the successful production of recombinant DNA—the ability to construct original DNA sequences in a laboratory—the first "genetically modified organism" (GMO) was created by Herbert Boyer and Stanley Cohen in 1973. In retrospect, 1973 would prove an important year for a number of other reasons as well. As Joshua Clover (2014) explains, 1973 marked a major "shift from industrial to finance capital" because of the publication of the derivative pricing formula known as Black-Scholes¹ as well as

the first in a massive series of 'oil shocks'; the final collapse of the Breton Woods agreements setting the stage for increasing global trade and current account imbalances; the secular decline in industrial profitability and the departure from the Fordist mode of production" (p. 11).

Finally, 1973 was also the inaugural year of the politico-economic formation known as neoliberalism: following the U.S.-backed coup beginning on September 11, 1973, Milton Freedman and his "Chicago School" assisted the military dictator Augustus Pinochet in restructuring Chile's economy according to neoliberal principles (Klein, 2007, p. 8). These principles, which included corporate deregulation, resource privatization, and the slashing of

¹ Briefly, Black-Scholes allows for a "perfectly hedged portfolio that would earn a "riskless rate of interest" by exploiting mispriced assets (called "arbitrage") (Clover, 2014, p. 11). Unlike previous pricing models, Black-Scholes ostensibly allows for "mathematically rational option pricing, independent of guesswork about future turns of the market" (Clover, 2014, p. 11).

social welfare programs, were quickly imported back into United States, solidifying neoliberalism as a global “*political* project to re-establish the conditions for capital accumulation and to restore the power of economic elites” (Harvey, 2005, p. 19, emphasis in original).

While the simultaneity of these scientific, economic, and political shifts is largely a calendrical coincidence, the form in which biogenetics developed is tightly bound up with these post-1973 economic transformations and the rise of neoliberalism. For instance, Melinda Cooper (2008) argues that biogenetics was quickly taken up by the petrochemical and pharmaceutical industries as a response to the impact of the oil shocks in the early 1970s (pp. 22-23). Neoliberalism’s drive toward privatization can also be seen in the passage of the Bayh-Dole Act in 1980, which had wide-ranging effects on scientific research. Cooper (2008) explains that, as a result of the Bayh-Dole act, “publically-funded science institutions would not only be authorized but well-nigh obligated to patent the results of their research,” allowing this publically funded research to be “privately exploited by the patent holders, who might choose to issue exclusive licenses to large private companies, enter into joint ventures, or to create their own start-up companies” (p. 27). This act also captures the central operation of neoliberalism, in which the privatization of public goods—or the increasing enclosure of the commons—is achieved through state intervention. Kaushik Sunder Rajan (2006) uses the phrase “biocapital” to describe this conjunction of the life sciences and neoliberal capitalism, reminding us that the life sciences are always “overdetermined” by the “political economic systems in which they emerge” (p. 6).

Paolo Bacigalupi’s (2009) award winning science fiction (SF) novel *The Windup Girl* delves into precisely this conjunction of economics, geopolitics, and biogenetics by imagining a dystopian future in which food production is completely controlled by a handful of global “calorie companies” who have successfully genetically engineered seeds to be non-fertile. Meanwhile, environmental catastrophe and food-borne diseases such as “cibiscosis” and “blister rust” threaten the world’s remaining population. However, Thailand, where the novel is set, has achieved a degree of autonomy from global capital due to its possession of a large “unmodified” seedbank. While extrapolating key tendencies of the present overlap between neoliberal global capital and the development of patented GM food production, Bacigalupi’s novel also reveals fissures between the nation-state and global capitalism in the latter’s quest for unfettered circulation of profits. This essay tracks *The Windup Girl*’s representation of biogenetics across time and space, exploring how seeds and other genetic material can become a terrain of struggle for the nation state and multinational capital—not simply a commodity through which value flows from the nation to global corporations. Both *The Windup Girl* and Bacigalupi’s earlier short story “The Calorie Man” (2008)—set in the same world as *The Windup Girl*—also engage utopian alternatives to biocapital and insist that other futures are possible. In *Windup Girl*, these alternatives take the form of this productive friction between the nation state and global capital in response to biopiracy. “The Calorie Man” extends this critique, ending with an authentically utopian moment in which genetically engineered (GE) seeds can become a part of the global common. Bacigalupi’s fiction thus uses the dystopian form to imagine the possibilities for an alternative, post-capitalist future for biogenetics.

SF is a key site for cultural narratives about biogenetics to take shape because biogenetics itself is centrally concerned with the possibilities of the future. As Cooper (2008)

explains, biocapital production can be understood as a break with traditional industrial production in that it reverses the flow of commodification from the past to the future:

While industrial production depletes the earth's reserves of past organic life (carbon-based fossil fuels), postindustrial production needs to depotentialize the future possibilities of life, even while it puts them to work. This counterlogic is perhaps most visible in the use of patented sterilization technologies, where a plant's capacity to reproduce itself is both mobilized as a source of labor and deliberately curtailed, thus ensuring that it never reproduces 'for free.' (p. 25)

Yet its depotentialization of future resources is not the only way in which biocapital is engaged in the management of the future. As Rajan (2006) explains, the "grammar of biocapital" is essentially "speculative" and concerned with the production of futures: because investment in biotech startups is always predicated on what *might* be produced, "hype" becomes speculative capitalism's mode (pp. 110-111). Within this speculative mode, "the future [is] always being called in to account for the present" (Rajan, 2006, p. 116). For financialized biocapital, the "future" thus becomes a resource, or something to be used up to advance the goals of capital accumulation in the present.

Biocapital thus depends on the neoliberal ideological climate that Mark Fischer (2009) calls "capitalist realism," or "the widespread sense that not only is capitalism the only viable political and economic system, but that it is now impossible to *imagine* a coherent alternative to it" (p. 2). Indeed, Rajan (2006) notes that his term "biocapital" attempts to capture the sense that biogenetic innovations are occurring within a socio-political framework (neoliberalism) in which capitalism is "considered the 'natural' political economic formation, not just of our time but of all times" (p. 3). It is here that SF can play a crucial role in questioning the inevitability of (bio)capitalist realism and—while it cannot provide a direct image of an alternative to capitalism—educate our desire for another kind of future.

At first glance, Bacigalupi's dystopian world might seem to acquiesce to such a dark vision of capitalist realism by presenting the likely consequences of our current path. However, I argue that we need to read Bacigalupi's work within the SF subgenre Tom Moylan (2000) names the *critical dystopia*, which is constructed to reveal both a bleak future and a hopeful alternative. The critical dystopia resists the ideological enclosure of capitalist realism and "reaches toward utopia not by delineation of fully detailed better places, but by dropping in on decidedly worse places" (Moylan, 2000, p. 106). If the classical dystopia suggests resistance will only end up making things worse, Fredric Jameson (2005) reminds us the critical dystopian text is in fact "a negative cousin of the Utopia proper, for it is in the light of some positive conception of human social possibilities that its effects are generated and from Utopian ideals its politically enabling stance derives" (p. 198). The addition of a desire for utopia, as well as an inkling that such an alternative is possible, distinguishes the critical dystopia from the anti-utopian defeatism of the classical dystopia. The critical dystopia thus keeps alive a radical systemic critique of the status-quo that serves as a warning against inaction or mere reformism.

It is through his dystopian vision of the future that Bacigalupi gives us both an estranged image of our present and the possibility of radical change. Kanya, a central character in *The Windup Girl*, provides an overview of its geopolitical setting:

[The Thai Kingdom is] alive when whole kingdoms and countries are gone. When Malaya is a morass of killing. When Kowloon is underwater. When China is split and the

Vietnamese are broken and Burma is nothing but starvation. The empire of America is no more. The Union of the Europeans is splintered and factionalized” (Bacigalupi, 2009, p. 214).

Thailand, however, is in the grip of a crisis, which primarily plays itself out through the conflicts between two government organizations: the pro-globalization Trade Ministry and the nationalist Environmental Ministry. Meanwhile, the calorie companies continue to gain a foothold in Thailand, looking to reestablish global trade and force the Thai Kingdom into their global hegemony.

Bacigalupi’s work is thus centered on the global. This global focus is not surprising for a work of contemporary science fiction; as Phillip E. Wegner (2014) notes, a “crucial desire of contemporary science fiction is to think the global” (p. xv). Indeed, Bacigalupi allegorizes our contemporary global system through its figuration of a new global “expansion.” The events of *Windup Girl* occur at a crucial juncture in Bacigalupi’s fictional world: while our own period of globalization—or what the novel calls the “old expansion...when petroleum was cheap and men and women crossed the globe in a matter of hours” (Bacigalupi, 2009, p. 16)—has ended due to ecological and biogenetic disaster, a “new expansion” is underway. For the Calorie Companies, the new expansion means “the return to truly global trade. Supply lines that circle the world” (Bacigalupi, 2009, p. 63). For the Thai Kingdom, however, the new expansion means the return of the “calorie companies and their plagues and their patented grains” (Bacigalupi, 2009, p. 27). The novel’s representation of biogenetics is centered on this tension between the nation and multinational corporations. What is ultimately at stake is not so much the autonomy of Thailand itself, however, but rather the ownership of the Thai seed bank. Indeed, the existence of the seed bank is the only reason the Thai Kingdom has been able to resist the Calorie Companies. The novel is an attempt to bring into focus these tensions between the nation state and global capital, particularly as these tensions intersect with the ownership of genetic material such as seeds.

In *The Windup Girl*, the Thai Kingdom also functions as a way of imagining nationalist resistance to global capital. Anderson Lake, who works for one of the world’s major calorie companies (AgriGen), describes the significance of the Thai seed bank:

Somewhere in the country a seedbank is hidden. Thousands, perhaps hundreds of thousands, of carefully preserved seeds, a treasure trove of biological diversity. Infinite chains of DNA, each with their own potential uses. And from this gold mine, the Thais are extracting answers to their knottiest challenges of survival. With access to the Thai seedbank, [the AgriGen labs in] Des Moines could mine genetic code for generations, beat back plague mutations. (Bacigalupi, 2009, p. 86)

Even Minister Akkarat, head of the Trade ministry and sympathetic to globalized trade, refuses Anderson’s request to “sample” the seedbank, telling him that “the seedbank has kept us independent of your kind[...] When India and Burma and Vietnam fell to you, we stood strong” (Bacigalupi, 2009, p. 151). The novel offers a complex portrait of the intersections between globalization and biogenetics: while biopiracy and the patenting of genetic material are ways in which multinational corporations extract surplus value from the world’s populations—and, as in the novel, this extraction overwhelmingly flows from the global south to corporations centered in the global north—genetic materials (cells, plant life, DNA) are also a point of resistance through which a nation-state might establish a temporary degree of autonomy from

multinationals. The primary task of *The Windup Girl* is to imagine these productive disjunctures between the nation state and globalized capital and interrogate how these disjunctures might open up onto political alternatives.

However, while the novel uses the nation state to undercut the seamless power of global capital, it not simply advocating nationalism as a solution to the problems of globalization. At the same time it demonstrates the friction between the nation state and global capital, the novel also points towards the limitations of any nationalist-based conception of politics. Bacigalupi primarily accomplishes his critique of nationalism by co-articulating the Thai Kingdom's nationalist resistance with a racist cultural nationalism in which immigrant workers and "windups," or genetically engineered human-robot hybrids used as soldiers or slaves, are treated as second class citizens—if they are allowed into the country at all. Immigrant workers—most of whom are from Malaysia, which is beset with religious violence—are pejoratively referred to as "yellow cards" and unable to find legal work. As Anderson explains, "Thai workers for Thai jobs. Yellow card refugees from Malaya are starving in the streets, but [factory owners] can't hire them" (Bacigalupi, 2009, p. 16). These immigrants primarily live in a large slum area precariously located by a seawall so that "if the seawall gave way, the entire slum would drown" (Bacigalupi, 2009, p. 69). This flooding becomes a very real possibility when Richard Carlyle, an employee of a calorie company, holds up a shipment of equipment for the city's levees (Bacigalupi, 2009, p. 97). The potentially utopian autonomy achieved by the Kingdom thus slides into a disturbing isolationism. Hock Seng, an immigrant factory worker, refers to the Thai Kingdom as a "sealed city" once the conflict between the Trade and Environmental Ministries turns violent, which results in the borders all being closed (Bacigalupi, 2009, p. 226). The novel ends with the city flooding, turning this isolationism into a death sentence for much of the Kingdom, but especially for the immigrant poor living in the slums.

Rather than advocating for one side in the conflict between the Thai Kingdom and the calorie companies, the novel is best read as an attempt to keep these two terms—allegorically, the nation and globalization—within a constant tension. While the nation remains a potential point of resistance which can never be fully subsumed under global capital, the ease in which it can be co-opted by capital prevents it from ever solidifying into a permanent alternative. In reading the novel, we should seek to keep this tension alive through a dialectical double negation in which the nation is used to critique globalization while the larger globalized system points to the inadequacy of an isolated nationalism. The goal in such a reading is to open the space for a neutral—or neither/nor—position that prefigures a global, utopian solution. As Jameson (2005) argues, the utopian solution to any ideological opposition lies in its neutralization, or the attempt to "retain two negative [positions...] along with their mutual negation of each other" (p. 180). In an ideological neutralization, the oppositions must neither be combined in some humanist organic synthesis nor effaced and abandoned altogether, but made more virulent, their incompatibility and indeed their incommensurability a scandal for the mind, but a scandal that remains vivid and alive, and that cannot be thought away [...] the biblical stumbling block, which gives Utopia its savor and its bitter freshness when the thought of Utopias is still possible. (Jameson, 2005, p. 180)

Since the opposition between the nation and capital in *Windup Girl* and "The Calorie Man" revolves around patented biogenetic food production, I will ultimately suggest that the utopian

solution in Bacigalupi's SF world lies in the common, or a new form of unfettered, free growing and unpatented food crops.

Through this double negation of the nation and globalized capital, Bacigalupi allows us to imagine productive tensions around biogenetics that hold open the possibility of a utopian future. This tension is figured in the novel by the character Kanya, who is torn between her loyalties to both Akkarat from the Trade Ministry and Jaidee, the head of the Environmental Ministry. Indeed, her torn loyalty generates the larger ideological opposition between these two Ministries, allowing us to see how the globalization/nationalism conflict takes shape *within* the nation state itself. As I will argue, however, the infighting between these two ministries is always already framed within the flows of globalized capital. So while the opposition between the Trade and Environmental Ministries that plays itself out in the novel allows us to grasp the fissures or gaps between the nation state and global corporations, this struggle itself is already overdetermined by the larger economic structures of capitalism. Thus the utopian solution cannot lie in either the Trade Ministry's position or the Environmental Ministry's position, but must instead be a negation of both positions.

The novel's action takes place during a moment of shifting hegemony in which the Environmental Ministry's influence is giving way to the Trade Ministry's pro-globalization stance. Jaidee observes that in the ten years he has worked in the Environmental Ministry, their "budget shrinks yearly while that of Trade increases" (Bacigalupi, 2009, p. 122). Minister Akkarat of the Trade Ministry becomes increasingly hostile to the Environmental Ministry, especially to Jaidee and his group of loyal supporters called the "white shirts." Unlike most of the Thai Kingdom's government, Jaidee and his white shirts refuse bribes from the calorie companies to import unapproved equipment and genetic material. For example, early in the novel, Jaidee and his supporters destroy a shipment of equipment and nutrient cultures imported by Anderson's company, despite the fact that Anderson has paid the customs agents to let the shipment pass (Bacigalupi, 2009, p. 52). Jaidee takes it as his mission to protect the borders of the Thai Kingdom from dangerous genetic material, which poses a problem for Akkarat, who desires the money and political influence the calorie companies can provide. The power of Akkarat and the calorie companies grows as the novel progresses, leading to the public humiliation of Jaidee and his eventual death. Kanya, Jaidee's second in command, is then promoted to head of the Environmental Ministry, an act which ostensibly secures Akkarat's victory since Kanya has been secretly working for him as a double agent. This victory is not absolute, however: after Jaidee's death, his ghost begins appearing to Kanya in visions, leading to her final act of loyalty to Jaidee in the novel's conclusion.

While the figure of Jaidee—both alive and as a specter haunting Kanya—represents a nationalist point of resistance to the multinational calorie companies, it is important to understand the ways in which the conflict between the Trade and Environmental Ministries is also overdetermined by the forces of globalization. It is not until the final moments of the novel that a true rupture becomes possible; prior to this moment, the calorie companies hold a great deal more power than even Minister Akkarat realizes, allowing the novel to demonstrate the limitations of national autonomy in an era of globalization. These limitations are revealed early in the novel when we learn that Anderson's company Spring Life—a front for his work for Agrigen—pays the Thai Kingdom "handsomely" to use part of their global "carbon budget" (Bacigalupi, 2009, p. 10). While the novel does not reveal the means by which a global carbon

budget is enforced, it seems to be modeled on contemporary “cap and trade” policies which turn carbon use amounts into a speculative commodity. Here, the deal between Anderson and the Thai governments reveals the limits of the latter’s autonomy and how the Thai Kingdom is already enmeshed within the flows of global capital.

The limitations of the Thai Kingdom’s national autonomy become more overt later in the novel when Carlyle reveals his plan to hold up a shipment of equipment used to keep the Thai Kingdom from flooding. By “holding the city hostage” to ensure Akkarat deals with the calorie companies, Carlyle demonstrates once again that the Thai Kingdom is already globalized (Bacigalupi, 2009, p. 97). He tells Anderson “the white shirts seem to have forgotten they need outsiders. We’re in the middle of a new expansion and every string is connected to every other string, and yet they’re still thinking like a contraction Ministry” (Bacigalupi, 2009, p. 97). In these passages, Bacigalupi works through the limitations of a strong nationalism under globalization. In a world in which complete national autonomy is impossible, no form of nationalism can become a permanent solution to the threat posed by multinational capital. Such a critique is reinforced by Bacigalupi’s setting: by situating the novel’s action during a second expansion—or a “repetition” of our moment of globalization—*Windup Girl* suggests that any kind of contraction caused by ecological or biogenetic crisis would only be temporary. The novel reminds us that, for better or worse, we are struck in an era of globalization and that any form of politics we imagine must deal with this reality.

While the novel rejects a simplistic retreat to national autonomy, the ending also demonstrates that the forces of global capital can never fully subsume nationalist resistance, either. The novel concludes with the apparent victory of the calorie companies: sterile seeds are being introduced to the country and Akkarat has promised AgriGen access to the Thai Seedbank (Bacigalupi, 2009, pp. 342, 348). As she is overseeing the transfer of the Thai Seedbank to the AgriGen scientists, however, Kanya is visited by Jaidee’s ghost. His appeal to her is explicitly nationalist, referencing the conclusion to the Burmese-Siamese War of 1767 which ended the Ayutthaya Kingdom: “would you not prefer to be remembered as a villager of Bang Rajan who fought when all was lost, and held the Burmese at bay for a little while, than as one of the cowardly courtiers of Ayutthaya who sacrificed a kingdom?” (Bacigalupi, 2009, p. 351). Jaidee’s ghost also metaphorically associates the seedbank with Thai culture, telling Kanya it is more important to preserve the seedbank than the city (which will be flooded if they refuse to comply with the calorie companies): “...it is our people who carry the lifeblood of our country, not this city...it is our people who are everything. And it is this seedbank that sustains us” (Bacigalupi, 2009, p. 351). The kind of nationalist resistance Jaidee is proposing here is thus very different from the territorial, geographically-based state nationalism of the Thai Kingdom at the beginning of the novel. With Jaidee’s encouragement, Kanya kills the AgriGen representatives and sends the seedbank away with a group of monks bound for “a secret place, far from calorie company reach, watched over by Phra Seub and all the spirits of the nation” (Bacigalupi, 2009, p. 353). As the city floods, Kanya, along with a new group of “white shirts,” leads the city’s population away from the flood, keeping the possibility of resistance alive.

The radical possibility embedded within Kanya’s actions also reaches toward a global, potentially utopian future. Kanya’s execution of the AgriGen representatives and measures taken to keep the seeds safe also allows for the possibility of a utopian solution to take shape later in the future. As Wegner (2014) argues in his reading of these final moments of the novel,

"*The Windup Girl* presents us with a striking refusal to let history, the concrete possibility for things to be otherwise, to come to an end" (p. 101). This refusal of historical closure is also figured in the appearance of Jaidee's ghost, which should not be understood as simply a reflection of the past, but rather an opening up onto the new. Here we might remember Derrida's (1994) reading of the specter in the opening sentence of *The Manifesto of the Communist Party*: the "specter of communism" invoked by Marx and Engels is only frightening for the bourgeoisie because it is "to come;" because "the specter is the future" (pp. 47-48). Ghosts are then never only about the past, but also the way in which the past causes us to act in order to bring about a different future.

Indeed, while Kanya's actions might seem to "resolve" the tension I have observed in the novel between the nation and global capital, it is significant that she only acts in the interests of nationalism *after* global capitalism has seemingly won. Prior to the moment of AgriGen's victory, she was keeping the two sides in tension within herself. Once the victor has been decided, she chooses to strategically align herself with the loser—not to resolve the tension between the two sides, but to keep it alive. By refusing to give AgriGen access to the seed bank and leading a new army of white shirts away from the city, she ensures the possibility of future struggles against their global hegemony. Kanya's actions are nationalism as negation: a strategic use of nationalist violence in service of a revolutionary movement against global capitalism. It is important that her actions are not based on the creation or maintenance of a strong nation state; they are simply the opening up of unimaginable future possibilities. As a negation of the forces of global capitalism, her actions also have a global dimension.

Such a distinction between Kanya's nationalism at the novel's conclusion and the Thai Kingdom earlier in the novel is important because the Thai Kingdom's nationalism is co-articulated with an anti-immigrant racism against both Malaysian workers and windups. Indeed, there are tense scenes in the novel in which Hock Seng (a Malaysian immigrant working for Anderson) and Emiko (a windup used as a sexual slave who, it later turns out, also has military software implanted within her) must both "pass" for Thai around groups of white shirts (Bacigalupi, 2009, pp. 204, 253). The case of the windups is especially important as it brings in issues of posthumanism and a critique of naturalist essentialism that will have a bearing on the representations of biogenetic seed technologies in Bacigalupi's fiction. Indeed, *Windup Girl* rejects the conservative position opposed to biogenetic engineering because it is "unnatural." Politically, this is a crucial move: not only does such a conservative position suppress the important issues revolving around global capitalism, but it also puts forth a nostalgic, essentialist imaginary of an "unspoiled" nature that is ahistorical and deploys homophobic and racist tropes. Precisely this sort of rhetoric is being deployed by the Thai Kingdom in *The Windup Girl*: as Emiko observes, she is considered by many "a transgression against niche and nature" (Bacigalupi, 2009, p. 106). The novel's critique of nationalist racism thus also extends to the kind of genetic normativity that reifies a conception of the natural. The utopian openings in both *The Windup Girl* and "The Calorie Man" reject such nostalgic positions, instead suggesting a repurposed biogenetic engineering pressed into the service of a new vision of the common.

While it is only in "The Calorie Man" that Bacigalupi makes explicit such a utopian possibility for seed production—although Kanya's refusal to hand over the seedbank to AgriGen keeps such a possibility alive—*The Windup Girl's* ending does imagine a post-human collectivity prefiguring a new world for the oppressed windups. After the city floods, Emiko is able to

survive in the city's ruins without interference—there are plenty of animals to catch for food and the water is helpful because she overheats easily. She soon comes across an old man named Gi Bu Sen (or Gibbons), a generipper kept prisoner by the Thai Kingdom to deal with cases of foodborne illness. When Emiko angrily confronts him about her programming and her sterility (since generippers are this world's version of bioengineers, scientists like Gibbons were responsible for creating windups), he tells her he can help overcome the design limitations of the windups, which he calls "New People." Gibbons tells her that while he cannot change her physically, he can produce a different kind of New Person from Emiko's genetic material: "a strand of your hair will do. You cannot be changed, but your children—in genetic terms, if not physical ones—they can be made fertile, a part of the natural world" (Bacigalupi, 2009, p. 358). Gibbons imagines a new "natural world" in which Emiko and her children will be able to live freely; by removing programming forcing them to be obedient, they will no longer serve as slaves to humans. Early in the novel, Emiko is comforted by a utopian vision of a village of free windups living in the north without owners (Bacigalupi, 2009, p. 46). The novel's final passages suggest that such a utopian vision can become real.

The alliance between Gibbons and Emiko in the final moments of the novel also rebukes the nostalgic imaginary of the White Shirts and the Thai Kingdom. In a tense meeting between Kanya and Gibbons earlier in the novel, he refuses her dichotomy of natural and unnatural: "nature...we are nature. Our every tinkering is nature, our every biological striving" (Bacigalupi, 2009, p. 243, emphasis in original). Gibbons is a complex character, however, and certainly not entirely sympathetic. For instance, his statement that "the world is ours. We are its gods" (Bacigalupi, 2009, p. 243) problematically places humans outside of nature and thus provides an excuse for its continued domination. Gibbons also reasserts a hierarchical vision among humans, replacing his collective vision of human gods with a telling singular one: "If you would just let me, I could be your god and shape you to the Eden that beckons us" (Bacigalupi, 2009, p. 243). It would therefore be unwise to read Gibbons and the post-human utopia suggested by *The Windup Girl's* final moments as an unambiguous representation of the text's vision of utopia; rather, Gibbons is necessary as an ideological negation of the white shirts and Kanya.

The two utopian figurations of the novel—the new band of white shirts led by Kanya and the post-human alliance of Gibbons and Emiko—thus continues the ideological tension I have argued runs throughout the novel. Gibbons points toward the problematic essentialism undergirding Kanya's version of nationalism while Kanya serves as a check on Gibbons' aggressive post-human experimentation that, as the novel's setting demonstrates, is quite amenable to global capitalist control (indeed, prior to being held captive by the Thai Kingdom, Gibbons worked for one of the calorie companies). Not only does this final double negation continue the novel's unbudging opposition between globalization and nationalism, it also suggests a way of thinking through biogenetic seed technologies. Both Kanya's and Gibbons' positions are deeply problematic when it comes to addressing bioengineering: Kanya's nostalgic essentialism is clearly inadequate to the complexities of the world, but Gibbons' hierarchical vision and unwillingness to consider the implications of his research for the rest of the world places him in precisely the position of the calorie companies. What is needed is a double negation of these positions that turns their utopian impulses—Kanya's opposition to global capitalism and Gibbons' opposition to biogenetic essentialism—into an anti-capitalist, global vision of equal access to the technologies of food production.

Such a utopian vision is closely related to the recent revitalization of the concept of the common on a global scale by Hardt and Negri (2009). Indeed, as a negation of neoliberalism's ever-encroaching privatization, the common is a crucial element in the struggle over genetically modified seeds. Following the work of Hardt and Negri (2009), we need to understand the common as an open signifier: not only does it include the classical conception of the "commonwealth of the material world"; but, perhaps even more importantly, it also includes "knowledges, languages, codes, information, affects, and so forth" that "are necessary for social interaction and further production" (p. viii). The common therefore should not only be conceived as the "relatively inert, traditional notion that generally involves natural resources," but also as "dynamic, involving both the product of labor and the means of future production" (Hardt and Negri, 2009, p. 139). This dual conception of the common is especially important for an analysis of genetically modified seeds, for which both kinds of common are relevant. Indeed, by imagining the common as Hardt and Negri (2009) do, we can also prevent it from being deployed as a nostalgic attempt to return to the pre-capitalist past preceding what Marx (1867/1976) calls "the enclosure of the commons" (p. 885). This anti-nostalgia also critiques the conservative position seeking a return to an "unspoiled" nature. Indeed, as a utopian project of imagination, the goal of the "common" is to negate the present—not as a way of returning to the past, but rather as a way of opening up the horizon of the future.

While such a vision of the common remains a repressed potentiality in *The Windup Girl*, it is given expression in Bacigalupi's earlier *Windup Girl*-world story "The Calorie Man," which is also his most straightforwardly utopian work. While published before *The Windup Girl*, "The Calorie Man" seems to take place after the events in the novel: the story's final moments suggest a utopian future that would completely transform Bacigalupi's dystopian world. The story takes place in the United States, home of the calorie companies, among the "lush sprawl of SoyPRO and HiGro" grown and shipped down to New Orleans to meet the calorie needs of the world (Bacigalupi, 2008, p. 93). A small-time smuggler named Lalji is hired to take Charles Bowman, a genetic engineer wanted by the calorie companies, down the Mississippi River so that he can escape the country. Lalji and his crew run aground of an Intellectual Property (IP) patrol while transporting Bowman. Bowman is killed in the skirmish along with the IP officers, which allows Lalji to escape along with Tazi, a young girl who Bowman has been protecting. In the story's final moments, Tazi reveals that she has a bagful of seeds Bowman has designed and asks for Lalji's help planting them.

Bowman, a former employee of the calorie companies, has developed a new strain of seeds that, unlike the patented ones owned by corporations, will breed on their own, thereby transforming all food production into an un-patentable common. Earlier in the story Bowman explains that his seeds will mix with and transform the sterile calories produced by the calorie companies:

What would happen if we passed SoyPRO a different trait [...] what if someone were to drop bastardizing pollens amongst these crown jewels that surround us? [...] Resistant to weevil and leafcurl, yes. High Calorie, yes, of course. Genetically distinct and therefore unpatentable? [...] Perhaps. But best of all fecund. Unbelievably fecund. Ripe, fat with breeding potential [...] Seeds distributed across the world by the very cuckolds who have always clutched them so tight, all of those seeds lusting to breed, lusting to

produce their own fine offspring full of the same pollens [...] (Bacigalupi, 2008, pp. 115-116)

These seeds created by Bowman share some similarities with the utopian potential of seeds we have seen in *The Windup Girl*: because they are fertile and unpatented, they offer a way of imagining an alternative future in opposition to the monolithic vision of biocapitalism.

There are some important differences between “The Calorie Man” and Bacigalupi’s novel, however: while the seeds in *The Windup Girl* carry with them a nostalgic connotation or an attachment to the past, Bowman’s seeds—no less genetically modified than the sterile calorie company ones—are unabashedly new and symbolic of the future. In “The Calorie Man,” Bacigalupi cuts through the opposition between natural and unnatural that undergirded *The Windup Girl*’s competing utopian impulses. “The Calorie Man” imagines scientific innovation pressed into the service of a collective future rather than a capitalist one. This story is thus an important intervention into discourses of biocapital, in which a key ideological assumption is that capitalism is “considered the ‘*natural*’ political economic formation, not just of our time but of all times” (Rajan, 2006, p. 3, my emphasis). Biocapitalism—like much of the discourse surrounding globalization—implies that innovation must be irrevocably tied up with the expansion of capitalism. Bacigalupi reminds us that other futures are possible by rejecting both senses of “natural”: the nostalgic associations of the term and the reification of capitalist realism.

The story concludes with an image of a new kind of globalization tied to the reinvention of the common—not a return to a pre-capitalist past, but an unnatural outbreak of a new common. After Bowman’s death and Lalji’s realization that he still has the GE seeds designed to breed with sterile ones, Lalji smiles and imagines the seeds’ global pathway: “around [the river], the crowding hulks of the grain barges loomed, all of them flowing south through the fertile heartland toward the gateway of New Orleans; all of them flowing steadily toward the vast wide world” (Bacigalupi, 2008, p. 121). This final image is a figuration of a new globalization being actively produced by Bowman’s engineered and fertile seeds. This utopian figuration is an important leap forward from the safeguarding of seeds found in *The Windup Girl*. As Hardt and Negri (2009) argue in their work on the common, it is crucial to understand the distinction between the traditional use of the “commons” as a pre-capitalist formation and what they call the “biopolitical conception of the common”: the struggles over the latter are not merely about “preserving” the common, but instead “struggling over the conditions of producing it, as well as selecting among its qualities, promoting its beneficial forms, and fleeing its detrimental corrupt forms” (p. 171). Bowman’s GE seeds are precisely such an intervention into the ongoing production of the common: they are not a preservation of what currently exists, but a radical creation of the new.

With this short story, Bacigalupi provides a positive utopian vision to complement the utopian negations structuring *The Windup Girl*. The futurity unlocked by Bowman’s seeds extends the possibility of the common embedded within the seedbank in *Windup Girl*. This representation of seed fertility becomes a powerful figuration for radical change. Within the context of biocapitalism—or the conjunction of bioengineering with the ideology that only capitalism can spur these scientific innovations—Bacigalupi’s works are powerful reminders that other futures are still possible. Positing the common as a utopian demand worth struggling for, these texts educate our desire for an alternative to the current configuration of biogenetic

engineering—not in the service of a nostalgic rejection of bioengineering and return to the pre-capitalist past, but a future-oriented transformation of the conditions in which bioengineering is used and a movement toward a utopian future.

References

- Bacigalupi, P. (2008). The Calorie Man. In P. Bacigalupi (Ed.) *Pump Six and Other Stories* (pp. 93-121). San Francisco: Night Shade Books. (Original work published in 2005)
- Bacigalupi, P. (2009). *The Windup Girl*. San Francisco: Night Shade Books.
- Clover, J. (2014). *Retcon: Value and Temporality in Poetics*. *Representations* 126 (1), 9-30. doi:10.1525/rep.2014.126.2.9
- Cooper, M. (2008). *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era*. Seattle: University of Washington Press.
- Derrida, J. (1994). *Specters of Marx: The State of the Debt, the Work of Mourning, and the New International*. New York: Routledge.
- Fischer, M. (2009). *Capitalist Realism: Is There No Alternative?* Washington: Zero Books.
- Hardt, M. and Negri, A. (2009). *Commonwealth*. Cambridge: Harvard University Press.
- Harvey, D. (2005). *A Brief History of Neoliberalism*. Oxford: Oxford University Press.
- Jameson, F. (2005). *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions*. New York: Verso.
- Klein, N. (2007). *The Shock Doctrine*. New York: Picador.
- Marx, K. (1976). *Capital: Volume 1*. (Ben Fowkes, trans.) New York: Vintage Books. (Original work published 1867).
- Moylan, T. (2000). *Scraps of the Untainted Sky: Science Fiction, Utopia, Dystopia*. Boulder: Westview Press.
- Rajan, K.S. (2006). *Biocapital: The Constitution of Postgenomic Life*. Durham: Duke University Press.
- Wegner, P.E. (2014). *Shockwaves of Possibility: Essays on Science Fiction, Globalization, and Utopia*. New York: Peter Lang.