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The environment, humankind, and slow violence in Chinese science fiction

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Abstract

This essay takes an analytical approach to examine some Chinese science fiction narratives with the themes of climate change, terraforming, and environment degradation—written from the mid-20th century to the early years of the 21st century. My broad reading of the texts treats these narratives as archive—textual sources that document a historical development of the impact of human activities on nature. On one hand, these narratives are all closely related to the country's modernization, its economic takeoff, and the rhetoric of building a powerful China. On the other hand, they form one set of what can be understood as an emerging body of Chinese fiction located firmly within the strata and sediment of the Anthropocene. This body of literature offers a venue for explaining and exploring how economics, technological developments, and government policies have transformed the ecology, environment, and climate in the Anthropocene. These narratives also echo the concept of *slow violence* dubbed by Rob Nixon in 2011. These terraforming and climate narratives reveal an attritional violence of environmental degradation, climate change, and the consequential social and political problems that permeate so many of our lives. My close reading of Chen Qiufan's novel *The Waste Tide* (*Huangchao*, 2013) specifically portrays a slow and attritional violence—namely, the ways in which the electronics recycling industry have caused severe environmental and occupational impacts on nature and humans—through exploration of the complex relationships among technology, the economy, and the environment.

Keywords

Anthropocene, China, environment, humankind, science fiction, slow violence

Global climate change, the depletion of natural resources, and environmental and ecological degradation are central challenges for policy makers and citizens of the 21st century. The United Nations has overseen the drafting of some important treaties to respond to these challenges, such as the "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal" in 1989, the "Basel Ban Amendment" in 1995, and "The United Nations Framework Convention on Climate Change" (UNFCCC) in 1992 and its addition of "the Paris Agreement" in 2015. The Nobel Prize winner Crutzen (2002) and a group of geologists formulated the concept of the *Anthropocene*, or human life as a geological force (p. 23). This concept emphasizes that the earth's climate has been increasingly affected by human activities ever since the Industrial Revolution due to the build-up of atmospheric greenhouse gases such as carbon dioxide and methane (Crutzen, 2002, p. 23). This human-induced climate change has been supported by major scientific bodies and research

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organizations throughout the world during the last two decades. In 2011, Nixon dubbed the term *slow violence* to emphasize the "slowly unfolding environmental catastrophes" caused by the "incremental and accretive" (p. 2) human activities during a relatively long period of time. By slow violence, Nixon (2011) means "a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and place, an attritional violence that is typically not viewed as violence at all" (p. 2). These catastrophes include "climate change, the thawing cryosphere, toxic drift, biomagnification, deforestation, the radioactive aftermaths of wars, acidifying oceans, and a host of other slowly unfolding environmental" (Nixon, 2011, p. 2) degradations. The media has for the most part played a vital role in increasing citizens' environmental awareness, informing the public of environmental risks, and influencing and monitoring the government's policies. However, Nixon (2011) argues that environmental catastrophes have yet to gain much traction in the mainstream media because of their delayed effects and less spectacular characteristics; this lack of media exposure hence hinders "our efforts to mobilize and act decisively" (p. 2). Therefore, Nixon (2011) indicates that "a major challenge [of slow violence] is representational: how to devise arresting stories, images, and symbols of the pervasive but elusive violence of delayed effects" (p. 3). He emphasizes that the significance of environmental narratives is that "imaginative writing can help make the unapparent appear, making it accessible and tangible by humanizing drawn-out threats inaccessible to the immediate senses" (Nixon, 2011, p. 15). He considers such environmental writers as Rachel Carson, Indra Sinha, and Nadine Gordimer to be "writer-activists" (Nixon, 2011, p. 5) because they "have deployed their imaginative agility and worldly ardor to help amplify the media-marginalized causes of the environmentally dispossessed" (Nixon, 2011, p. 5).

This essay takes an analytical approach to examine some Chinese science fiction narratives with the themes of climate change, terraforming, and environment degradation—written from the mid-20th century to the early years of the 21st century. By analytical approach, I mean that when I discuss the texts, I relate the works' thematic concerns and motifs of terraforming and climate change to the historical, socio-political, and technological background of the time; my analysis is informed by scholarship in science fiction and environmental fiction. The essay involves two layers of readings: the overview reading of groups of fiction and close reading of an exemplary text. My broad reading of the texts treats these narratives as archive—textual sources that document a historical development of the impact of human activities on nature. I argue that this body of literature offers a venue for explaining and exploring how economics, technological developments, and government policies have transformed the ecology, environment, and climate in the Anthropocene. My close reading of Chen Qiufan's novel *The Waste Tide* (*Huangchao*, 2013) specifically portrays a slow and attritional violence—namely, the ways in which the electronics recycling industry have caused severe environmental and occupational impacts on nature and humans—through exploration of the complex relationships among technology, the economy, and the environment. My analysis of *The Waste Tide* will explicitly reveal the relationship between the text and the practices of China's economic takeoff, technological developments in the recycling industry, and Chinese governmental policies on plastic waste importation and rare-earth exportation.

1950s to late 1970s: eulogies of technology's conquest of nature

When Crutzen (2002) raises the concept of Anthropocene, he emphasizes the changes of global temperature caused by the anthropogenic emission of greenhouse gases (p. 23). "Anthropocene indicates that atmospheric warming is not merely a theory, but a phenomenon that has already been measured and verified across scientific disciplines and conclusively linked to human emissions of fossil fuels" (Trexler, 2015, p. 4). The literary critic Trexler (2015) indicates "the concept of the Anthropocene helps explain the widespread phenomenon of climate change fiction" (p. 9). He prefers the concept of Anthropocene instead of climate change when he discusses novels dealing with the theme of climate change. In addition to the emission of greenhouse gases, there are other human actions that have also contributed to changes in global temperature and climate, including the expansion of the human population, the unchecked exploitation of land, the increasing use of fossil fuels,

and large terraforming/geoengineering projects (Trexler, 2015, p. 9).

In his study of terraforming texts, Fogg (1995) indicates that terraforming contains two subsets of planetary engineering: terraforming alien planets and terraforming the Earth (p. 90). Another scholar Pak (2016) points out that "scientists and environmental philosophers have used the concept of terraforming as a thought experiment to consider human relationships to environments undergoing change" (Pak, p. 8). Terraforming "involves processes aimed at adapting the environmental parameters of alien planets for habitation by Earthbound life, and it includes methods for modifying a planet's climate, atmosphere, topology, and ecology" (Pak, 2016, p. 1). Terraforming fiction is among the closest kin of climate fiction, and sometimes overlaps with climate fiction. Trexler (2015) observes that

> Human-altered climates were of grave concern to authors before greenhouse gas emissions attracted wide scientific interest. Terraforming—the purposeful transformation of a planet's climate (usually) to make it more hospitable to humans—surfaced in science fiction at least as early as 1951. (p. 8)

This observation applies equally well to Chinese science fiction. Since the 1950s, many Chinese science fiction narratives have dealt with the themes of climate change and terraforming. The subject matter of these texts includes creating artificial precipitation to increase agricultural yields on Earth; engaging in large geoengineering projects on Earth for land reclamation; transforming the natural environment on Mars to make it humankind's second planetary home; and exploring various dimensions of time and space to cope with society's problems of overpopulation and resource depletion.

From the late 1950s to late 1970s, many Chinese sf narratives were written about engineering the climate and transforming wilderness into farmland on Earth. Three factors have contributed to the emergence of this kind of fiction during that period: a conscious response to Mao Zedong's exhortations to conquer nature; the influences of the popular science writing and science fiction from the former Soviet Union; and advances in Chinese meteorology. In the early 1950s, the traditional Chinese ideal of harmony between heaven and humankind was abrogated in favor of Mao's insistence that humanity must conquer nature (*rending shengtian*). *Rending xi shengtian* originally appears in Liu Guo's (1978) *Collection from Long Zhou: Song of Xiangyang* (*Longzhou Ji: Xiangyang ge*) and means if people unite and are determined, their strength can exceed nature. In the late 1950s, Mao quoted this sentence in classical Chinese to emphasize his determination to build a New China. In her book *Mao's War Against Nature*, Shapiro (2001) explains how this particular sentence was promoted and used by the Party's propaganda in Mao's mass-mobilized migrations and campaigns in the 1950s and 1960s (pp. 1–20). Mao's triumphalist rhetoric unfolded during a series of mass campaigns to resettle Han Chinese migrants in remote borderland regions in an attempt to open up wastelands and better secure border regions during the 1950s and 1960s. These mass-mobilized migrations severely impacted the mountainous regions of southwest China, the deserts of Xinjiang in the far west, the grasslands of Inner Mongolia in the northwest, and the Great Northern Wilderness in the Northeast's Heilongjiang province (Shapiro, 2001, p. 142).

During this period of time, many Soviet popular science writings and science fiction works about geoengineering and terraforming had been translated into Chinese and garnered strong interest among Chinese writers and readers. Meanwhile, some meteorological research in China focused on the occasionally disastrous effects of global atmospheric circulation on both China's own climate and that of the world in general. Various Chinese meteorologists engaged in experiments involving the artificial manipulation of local weather and agricultural meteorology (Zhang, 1995, p. 681). Under these circumstances, the early Chinese climate narratives tend to focus on the malleability of local climate and weather, improvements to the soil, transformations of the land, and responses to natural disasters. These narratives articulate a heady optimism about the wonders of technology. Weather modification and land reclamation are two of the dominant literary strategies connected with climate change and terraforming. In these narratives, artificial rainfall or snow is created mainly for the benefit of agricultural production and urban life. For example, in Tao Bennai's short story "Stories of a Climate Company" (*Qixiang gongsi de*

gushi, 1959), the business activities of a climate company in Beijing include the generation of artificial precipitation, the dispersal of fog, and the elimination of damaging meteorological phenomena such as typhoons and hailstorms. The company can also use technology to guide moisture-laden airflows from Southern China to arid regions in Northern China. In coastal areas, the company launches meteorological rockets over the sea to deprive tropical storm systems of the amount of heat energy they need to become bona fide hurricanes. Liu Xingshi's "Northern Clouds" (*Beifang de yun*, 1962) is about creating artificial precipitation as a solution to water shortages in northern China. In Wang Guozhong's short story "Dragon in the Bohai Sea" (*Bohai jülong*, 1963), the author envisions using modern technology to drain submerged wetlands in the Bohai Gulf to reclaim land for agricultural uses such as growing legumes and herbs.

These themes continued in the sf narratives written in the late 1970s. For example, in Xie Shijun's "Stratospheric Precipitation" (*Hangtian boyu*, 1979), scientists pack a special type of soil nitrogen into rocket-bound bombs. Unmanned rockets carry these bombs into the stratosphere and release them over the targeted drought region. Soil nitrogen from the exploded bombs reacts with moisture in the air to form rainfall. In addition, the extra nitrogen in the rain droplets also stimulates plant growth. In Wang Yafa's "An Interesting Incident Outside the Sports Field" (*Qiuchangwai de quwen*, 1979), clouds are seeded with dry ice and silver iodide to induce precipitation. Then people use ultrasound waves to break down the ice crystals and water drops in the clouds to create rainfall.

1980s: environmental awareness and skepticism about the conquest of nature

From the late 1970s, some novelists started to write about generating damaging weather events in enemy territory as a military tactic in such sf thrillers or detective narrative as Hu Gen's "Zone Sixteen" (*Shiliu hao quyu*, 1980), Wei Yahua's "Window in Sky" (*Tianchuang*, 1980), and Jin Tao's "Typhoon Action" (*Taifeng xingdong*, 1981). All these stories adopt a Cold War framework to tell stories about the Western super powers using nuclear explosions, meteorological rockets, or other forms of technology to manipulate local climate in wars.

In addition to this fiction about weather modification, some Chinese sf narratives expanded their thematic range to include terraforming alien planets or engaging in geoengineering projects on Earth in order to more fully exploit natural resources. For example, Wang Qi's short story "Rose and Sword" (*Meigui yu baojian*, 1978) writes about human beings collecting specimens of rocks and ores and conducting geographical survey on an alien planet called "N." Liu Xingshi's "Eye of the Sea" (*Haiyan*, 1979) is about building terrace dams in a subterranean stream in order to generate hydro power in the western part of Guizhou province; this underground water was thereby diverted for use as agricultural irrigation.

In the course of addressing such themes as weather modification, land reclamation, and energy exploitation, a new sort of environmental awareness started to emerge among readers of these works around 1980. In many narratives, the purposes of the geoengineering projects were not only to help agricultural production but also to cope with problems such as environmental pollution, water shortages, and the depletion of fossil fuels and other natural resources. Some works even directly address the impact of industrial pollution on marine ecosystems, as highlighted in Huang Shengli's "Mysterious Incident" (*Shenmi de shijian*, 1981).

More critical and skeptical views about terraforming and human manipulation of the climate emerge in Zheng Wenguang's *Descendant of Mars* (*Zhanshen de houyi*, 1984). This novel reflects the author's heartfelt skepticism about human interference with nature and climate, specifically Mao Zedong's radical assaults against nature during the 1950s and 1960s. This reflective and critical trend in Chinese Anthropocene fiction in the early 1980s was influenced by the liberal intellectual trends of "bidding adieu to the revolution" and "contemplative literature" during the Post-Mao cultural thaw (1976–1983) in China. It also has a lot to do with China's burgeoning new field of environmental studies. In the 1970s, severe environmental pollution

from industrial wastes such as offshore from the northeastern port of Dalian garnered the attention of the central government. The government started to fund environmental research into industrial effluent's pollution of rivers, coastal waters, and farmland (Hao, 1995, p. 1531). In the 1980s, environmental impact studies were undertaken on such large geoengineering projects as the Three Gorges Dam and the South-to-North Water Diversion Project (Hao, 1995, p. 1538).

1990s to the present: exposing environmental problems and seeking solutions

Advances in China's environmental science, elevated environmental awareness, and the relatively liberalized intellectual atmosphere during the 1980s helped many of the most respected sf authors and filmmakers to approach the themes of terraforming and climate change in a more critical and reflective manner than was possible during the Mao Era. Since the 1990s, ecological destruction through climate change and the possible extinction of humankind have become central to authorial interpretations and attracted significant critical attention.

A landmark in this trend was the eco-sf film *The Ozone Layer Vanishes* (*Daqiceng xiaoshi*, 1990), directed by the Chinese filmmaker Feng Xiaoning. In this film, three tankfuls of toxic chemicals are mistakenly emptied onto the ground during a train robbery. These volatile chemicals vaporize and rise through the sky till they burn through the ozone layer of the atmosphere, hence endangering most life on Earth, including humankind. In a similar vein, various sf narratives explore other human-induced disasters. These works also imagine either economic collapse or a new era of sustainability, and sometimes describe a complex transformation of the economy and even culture itself. One such narrative is Liu Cixin's *The Underground Fire* (*Dihuo*, 2000), which discusses the gasification of coal to reduce air pollution and increase energy efficiency. Another is Liu's *Earth's Cannon* (*Diqiu dapao*,2003), about the over-exploitation of Earth's resources, economic collapse caused by massive geoengineering projects, and the disastrous consequences of excessive methane emissions. Che Qiufan's *The Waste Tide* is about how electronic wastes damage both human health and that of the environment.

Mindful of the Chinese sf legacy of artificial precipitation, Liu Cixin wrote two stories about human-caused rainfall, *Round Soap Bubbles* (*Yuanyuan de feizaopao*, 2004) and "The Butterfly Effect" (*Hundun hudie*, 2001b). *Round Soap Bubbles* not only offers a method for solving the problem of water shortages but also presents an analogue of the large hydroengineering projects in contemporary China. In "Butterfly Effect," the protagonist tries to create overcast and rainy weather in order to delay or even prevent aerial bombings of his hometown during NATO's war with Serbia. These narratives bring characters into confrontation with an immediate climatic change and allow readers to have a glimpse of its effect on local places and individual lives.

In addition to these texts closely related to climate change, there are also some terraforming texts that go beyond climate change to explore ways of dealing with threats to human extinction, such as Liu Cixin's *The Micro Era* (*Wei jiyuan*, 2001a) and He Xi's novellas *Alien Zone* (*Yi yu*, 1999) and *Six Realms of Existence* (*Liudao He*, 2002). These texts push terraforming methods to the extreme—genetically modifying human body size and exploring more dimensions of both space and time to create more living space and food for the exponentially rising human population—and to find ways of reducing consumption. The extremes of spatial and temporal scale explored in the above three terraforming narratives "allow us to imaginatively re-situate our values with respect to our place in the universe, thus, calling for a re-evaluation of the assumptions behind varying positions to nature and to each other" (Pak, 2016, p. 7).

My interpretations of such texts from various decades time reveal various patterns in Chinese Anthropocene fiction since the 1950s. Early climate fiction from the late 1950s to the late 1970s tended to focus on the theoretical malleability of global climate, along with a focus on weather modification and land reclamation. Through the 1980s, environmental problems grew as an area of concern, and Chinese authors started to reflect on how weather

modification and geoengineering projects could impact ecology and global climate. Subsequently, sustained and speculative explorations of climate change and environmental degradation began to emerge as key literary themes in the 1990s. The subject matter also expanded to include deforestation, urban development, toxic waste, and depletion of the ozone layer. More importantly, these works cohere with the Gaia hypothesis in the way that "the Earth's planetary environment and its organisms are fundamentally interconnected in a biogeochemical cycle and that life provides feedback that assists in regulating Earth's climate" (Pak, 2016, pp. 7–8).

From a precious island to a silicon island

"To date, nearly all Anthropocene fiction addressed the historical tension between the existence of catastrophic global warming and the failed obligation to act. Under these conditions, fiction offered a medium to explain, predict, implore, and lament" (Trexler, 2015, p. 9). Chen Qiufan's *The Waste Tide* is one such novel that responded to the "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal" with a call for internationally coordinated action to address this issue. The novel reveals the necessity of participation in international conventions on the control of hazardous waste and its disposal. The cooperation between China and the United States, the world's top two emitters of greenhouse gases, has been seen as a major factor leading to successful climate change mitigation and waste control. The PRC government announced new regulations banning the importation of 24 different types of wastes from Western countries at the end of 2017. The ban went into effect in January 2018 with a 5-month transitional period. This ban is a further step that China made after ratifying "the Basel Convention" and "the Ban Amendment" to prevent hazardous wastes from being shipped from developed countries to less developed or developing countries, particularly those within Asia. In contrast, the US government not only has not ratified the Basel Convention, but has also exempted e-Waste from export regulations in the "Resource Conservation and Recovery Act (RCRA). "Over the years, RCRA has exempted more and more toxic wastes simply because they are claimed to be destined for recycling operations" (Puckett et al., 2002, p. 28). However, what the Basel Action Network (BAN) has "discovered in Asia indicates that very much of the imported material ends up being dumped as non-recyclables or is released as residues, or emissions to air" (Puckett et al., 2002, p. 28). *The Waste Tide* is a literary demonstration of how these RCRA-exempted waste products end up in China as non-recyclables and cause environmental and occupational damages to the locale.

The Waste Tide is the type of novel that Raymond Williams (1983, p. 238) has called for and Nixon (2011, p. 45) has related to his analysis of slow violence: the novel attends to "'the close living substance' of the local while simultaneously tracing the 'occluded relationships'—the vast transnational economic pressures, the labor and commodity dynamic—that invisibly shape the local." My analytical reading of *The Waste Tide* will reveal the complex story of how Guiyu, a southern Chinese coastal town, has transformed its economy from fishing and rice farming to that of China's largest electronic-waste recycling hub since 1995. I also reveal how Guiyu's soil, water, and human health have been damaged by this imported waste, along with how local enterprises, government officials, and foreign businesses have connived to pursue short-term profits at the expense of long-term environmental sustainability. *The Waste Tide* focuses upon three of the defining characteristics of Guiyu's economy: first, the widening gap that separates the local rich from the destitute migrant workers; second, the ecological degradation that most directly impacts the health and livelihood of the poor; and third, exploitation by powerful transnational corporations in the name of recycling wastes and mitigating environmental hazards. These characteristics act as attritional violence unfolding their destructive effects on the environment and human health over a long period of time.

The Waste Tide is a complex work of environmental fiction framed in multi-layered but interwoven narratives which involve distinct social groups and issues. Chen Qiufan (2013) describes his novel as "realistic science fiction" (p. 259), which is "a

response to the reality that technology has become an inseparable part of life" (Chen & Dong, 2018, para 1). He indicates that nowadays it is hard to imagine an experience in ordinary daily life that is not connected in some way with technology. His realistic science fiction insightfully portrays the various roles that science and technology play in people's lives. Chen notes that his novel deals directly with real-world issues and concerns in contemporary China. What he has done differently from most novelists is to have injected sf elements into an overall framework of literary realism (Chen & Dong, 2018, para 1). He has gone so far as to borrow the visual arts term of "hyper realism" (Chen & Dong, 2018, para 2) in order to characterize the aesthetic style of his novel. Chen defines hyper realism in literature as a kind of "reality overload in the information society" (Chen & Dong, 2018, para 2). In the information age, people are not only immersed in a physical reality but also in virtual and psychological realities. He strives to present a complete and holographic portrayal of reality with multi-faceted and interlocked relations in *The Waste Tide*.

The dominant theme of the novel is how the e-waste recycling industry has caused irreparable environmental and occupational damage to Guiyu and its residents. Transnational shipment of hazardous waste from the West to the southern Chinese city is an outsourcing of the environmental crisis and a spread of slow violence to the developing country. This environmental theme is interwoven with profound socio-political and economic themes, such as poverty and social stratification caused by uneven economic development in China; worsening disputes between management and labor; foreign capital's invasion of the local economy; and nostalgia for one's native soil and traditional lifestyle in an era of globalization. The author also depicts more cerebral and complex issues such as tensions between the human and posthuman and coping with strict government censorship of the Internet and control of the media. These tensions and conflicts enable the novel to be read from multiple perspectives such as magic realism, cyberpunk, native soil literature, environmental literature, and political fiction.

First, we will look at the environmental, socio-political, and economic realities depicted in the novel. The primary thematic concern of the novel is the tension between the economic takeoff in Guiyu and the environmental hazards which accompanied it. In addition to this major tension, there are also conflicts between the management represented by the Guiyu entrepreneurs and the migrant workers from rural hinterland; conflicts between the radical environmental organization Huandong and the international company Wealth Recycle Co. Ltd.; and the conflicts of interest between local enterprises, local government, and international investors. The prototype of the fictional city Guiyu (literally Silicon Island) in *The Waste Tide* is the actual Cantonese city of Guiyu (literally Precious Island), which is very close to the author's hometown. Guiyu, Fujian, is one of the China's top container ports and has long symbolized the PRC's role as the main recycler of the world's electronic waste. In 2002, the BAN and Silicon Valley Toxics Coalition (SVTC) co-publicized an investigatory report about the impact of high-tech waste on Asian countries. The report contains a section on Guiyu that notes, "In the course of three intensive days, the investigatory team conducted interviews, shot video and still photographs, and took spot sediment, soil, and water samples near and within the town and vicinity of Guiyu" (Puckett et al., 2002, p. 15). The report adds, "We do not claim that what we witnessed was representative of all e-waste recycling in China. Rather, it must be seen as one view—and perhaps a view of the 'tip-of-an-iceberg'" (Puckett et al., 2002, p. 15). "The test results revealed alarming levels of heavy metals that correspond very directly with those metals most commonly found in computers" (Puckett et al., 2002, p. 22); the water sample taken near the spots where the circuit boards were de-soldered, stripped, and burned "revealed lead levels that were 2,400 times higher than World Health Organization (WHO) Drinking Water Guidelines" (Puckett et al., 2002, p. 22). This scientific report concludes that "Guiyu is very seriously polluted, and [it] signals an urgency to find out how widespread the problem really is, and how far it has impacted the health of the community and its residents" (Puckett et al., 2002, p. 22). While the BAN report presents scientific evidences of the serious pollution and environmental degradation in Guiyu, *The Waste Tide* provides a literary

counterpart to the scientific report, presenting the casualties of slow violence—environment and human—the "casualties most likely not to be seen, [and] not to be counted" (Nixon, 2011, p. 13) because of the delayed effects and the victims' impoverished status.

In *The Waste Tide*, Scott Brando, a profiteering corporate representative of Wealth Recycle Co. Ltd., visits Guiyu in the hope of signing an agreement with the local government to set up a Guiyu electronic waste recycling business joint venture. Brando is accompanied by his interpreter Chen Kaizong, a college graduate with a degree in history who was born in Guiyu and emigrated to the United States with his parents when he was a teenager. The author probes the underbelly of the electronics recycling industry from the vantage point of these two focalizers and reveal two contrasting social milieus in the region of Guiyu—the city versus various nearby villages. The local Guiyu people and the newly rich live in the city, which is full of luxury villas and world-famous brand name stores. Fancy cars are stuck in heavy traffic next to tractors carrying large tanks of drinking water, since the water in local rivers and streams has become too polluted to use. Clean drinking water must be hauled into town each day from Huang Village, which is about 9 km away from Guiyu.

When Scott Brando and Chen Kaizong enter a nearby village, what they see is shocking. The village is full of small and specialized e-waste recycling shelters and yards. The dismantling operations take place at the sides of narrow streets; people use hammers, chisels, and often their bare hands to dismantle and separate electronic waste components such as printer toner cartridges, circuit boards, and computer power supplies. Wiring is often burned on site, while circuit boards are acid stripped in order to separate out and recover small amounts of precious metals. Workers do not wear any protective respiratory equipment when dismantling the circuit boards or burning plastic components. Broken glass from televisions and computer monitors are scattered amidst plastic e-waste in countless piles dumped in open fields and along riverbanks, ponds, wetlands, streams, and irrigation ditches. The air has been polluted by smoke and ash particulates, chemicals used in acid stripping, and toxic lead and tin fumes from soldering. Children play among the ash heaps. Village women use the contaminated surface water for drinking, cooking, and washing. Although these migrant workers realize the hazardous nature of the polluted water, they cannot afford to buy clean drinking water in the way that the relatively wealthy Guiyu urbanites do. Because of the migrant workers' marginalized position, both geographically and socially, their suffering remains invisible from the mainstream media and Guiyu urbanites. Environmentally embedded violence is not difficult to source, but hard to oppose and reverse because it is so entangled with the local economy and workers' livelihood.

In addition to the pollution of the air, soil, and water that have been witnessed, various other toxic pollutants generally go unnoticed because the public is mostly unaware of these hidden threats. Medical wastes are among the hidden threats that the novel reveals through the experiences of the female protagonist Mimi.

When discussing the 1986 Chernobyl disaster and the fictional reworking of the Bhopal gas leak in 1984 in Indra Sinha's *Animal's People*, Nixon (2011) borrowed the term *foreign burden* from a victim of the Chernobyl nuclear disaster. One coal miner named Dmytro who helps with the remediation work at the Chernobyl disaster site depicted his body's radiation load as a "foreign burden" in an interview. He means he is "harboring an alien, unnatural, and disquieting force within" (Nixon, 2011, p. 50). Nixon (2011) utilizes this term in his discussion of slow violence and argues that a foreign burden is burdensome not just "in a somatic sense, but in a geo-temporal sense as well: his post-Soviet Ukrainian body remained under occupation by a Soviet-era catastrophe" (p. 50). The concept of a foreign burden offers a productive prism through which to approach Mimi's physical transformation.

Mimi is a teenaged migrant worker in the recycling industry whose employer provides practically no protection from hazardous materials. Mimi contracts a dangerous virus when accidentally coming into contact with an artificial-intelligence headgear contraption that had been used in scientific experiments on a gorilla. The headgear was shipped to Guiyu as medical waste after the experiments. Having worked in Guiyu for a few years, Mimi has

breathed in many hazardous gases and poisonous particulates. Some of these particulates have entered her brain through the bloodstream. These foreign burdens—viruses, particulates, and electronic shocks—combine to transform Mimi into a cyborg whose brain is now compromised by a sort of dehumanizing machine interface. Mimi serves as a symbolic condensation of a large group of the economically orphaned, abandoned to their fate by China's economic takeoff. Mimi's transformation into a cyborg externalizes slow violence and simultaneously questions other forms of mutability. Her transformation also exemplifies the dissolution of "the boundaries of [her] humanity through the slow, corrosive violence of environmental catastrophe" (Nixon, 2011, p. 54). Chen Qiufan has created in Mimi "a potent compression of disturbing, porous ambiguity, a figure whose transformation confounds the borders between the human and the post-human as well as the borders between the national and the foreign" (Nixon, 2011, p. 55).

Mimi's unfortunate transformation into a cyborg pushes forward the novel's plot development and triggers an uprising by many of the local migrant workers. The dangerous medical waste in the area also attracts the attention of a radical environmental protection organization called Kuandong. This organization tries to trace the exportation of hazardous medical waste from various foreign countries to Guiyu and focuses on artificial limbs, organs, and accessories such as the experimental headpiece that infected Mimi. It is also through Kuandong that readers learn about the international trade in recycling hazardous wastes.

The major impetus behind the rapid development of the hazardous waste recycling business has been the depletion of natural resources on Earth. The Wealth Recycle Co.'s corporate representative, Brando, has tried to persuade the local Guiyu government officials to sign an agreement by claiming that the corporation is doing all it to reduce environmental and occupational hazards to workers in its Guiyu operations. This corporation has promised to use modern technology and up-to-date managerial techniques to improve the efficiency of its recycling and reduce the amount of pollution released into the environment. The corporation also promises to create jobs with generous social welfare benefits and to set aside some of its profits into a fund for environmental protection and clean-up. In return, the Wealth Recycle Co. will pay relatively low prices for the recovered rare-earth metals (mainly lanthanide, scandium, and yttrium). These rare-earth elements are integral to many high-tech products such as smartphones, hybrid cars, solar panels, and high-tech weaponry. The PRC owns about 30% of the world's total reserves of rare earths and has controlled the vast majority of the world's supply in recent decades. China has imposed export restrictions on rare earths since 2007, causing their prices to go up rapidly in the international market. The Wealth Recycle Co. has developed a technology to recover 80% of the rare-earth metals found in electronic waste such as chips, batteries, and monitors. However, due to the dangerous pollutants that are widely released to the environment in the recycling process, the company has decided to set up its recycling center overseas in China. Therefore, in the name of developing the waste recycling business, hazardous wastes and the severe pollution that results from their processing are transferred to a developing country. The PRC's relatively cheap labor and lax environmental regulations significantly lower the costs of recovering the rare-earth metals during the recycling process, and the corporation is able to pay contractually guaranteed low prices for the recovered rare-earth metals.

When considering the foreign corporation's proposed contract, the local government and the Luo, Lin, and Chen family local enterprises do not pay much attention to their businesses' environmental impact, but instead focus mostly upon money-related issues—policies related to profit sharing, hiring and firing laborers, worksite availability, and price guidelines for the recovered rare-earth metals (Chen, 2013, p. 189). During negotiations, the main bones of contention arise these family-run enterprises, which have controlled the local recycling industry for many years. They purchase truckloads of imported e-waste from the seaport docks; transport these wastes to hundreds of the small recycling shelters and yards for dismantling, separating, and recovering; and finally sell the recycled or reusable items to other companies at a profit. They typically pay their migrant village workers low wages so as to reap higher profits. Therefore, the establishment of a

centralized and modernized waste recycling center will deprive them of their usual opportunities to rake in windfall profits. At the end of the novel, with the death of the local capitalist villain Luo Jincheng, the Wealth Recycle Co. signs an agreement with the Guiyu government to initiate the first 3-year phase of operating the recycling economic industrial park. The Lin and Chen families thereby become the two major business rivals in the local Guiyu waste recycling industry. The Wealth Recycle Co. agrees to establish a new foundation to help those migrant laborers whose state of health has been seriously compromised while working in the recycling industry. Chen Kaizong, the interpreter and young historian, finally joins the environmental protection organization Kuandong and monitors vast patches of garbage in the ocean—islands of floating trash composed of plastic and other landfill garbage that people have dumped into the ocean. The emergence of giant floating patches of garbage in the oceans is yet another human-induced environmental crisis in the Anthropocene.

The conclusion of the novel amounts to a sort of compromise. The joint venture recycling business will supposedly mitigate environmental hazards and reduce the rate at which pollution increases; and modern technology will supposedly enable laborers to encounter fewer environmental hazards. Similar to Sinha in his *Animals' People*, "by making an occluded economic relationship" (Nixon, 2011, p. 52) manifest through the plot of setting up a joint-venture electronics recycling center, Chen Qiufan "ingeniously resolves the dilemma that Raymond Williams posed: how to give a novel a local materiality while exposing the web of transnational forces that permeate and shape the local" (Nixon, 2011, p. 52). However, the joint venture enterprise's efforts at mitigation will not ease tensions between industrial production and environmental degradation because the recycled metals and plastics will go directly back to unsustainable levels of production and consumption; nor will these measures solve the social problems aggravated by environmental degradation, namely accelerated social stratification and human alienation. The migrant workers will continue to earn minimal wages for their sweatshop labor. This is in this sense that the novel echoes what Nixon (2011) calls "the environmentalism of the poor" (p. 4)—one of his major concerns in his discussion of slow violence. According to Nixon (2011),

> It is those people lacking resources who are the principal casualties of slow violence. Their unseen poverty is compounded by the invisibility of the slow violence that permeates so many of their lives … It is against such conjoined ecological and human disposability that we have witnessed a resurgent environmentalism of the poor. (p. 4)

The Waste Tide similarly addresses the environmentalism of poor migrant workers from rural China.

The loss of farmland and the uneven development of the economy throughout the PRC have helped spur the migration of laborers from the rural hinterland to relatively developed coastal cities. In the novel, we see a multi-faceted type of segregation between rural migrant workers and native Guiyu urbanites. Environmental degradation in the work zones outside of the city further aggravates this segregation. Native Guiyu urbanites live inside a city that is at a distant remove from the polluted rural worksites where the migrant workers live and work. The prejudiced native urbanites despise the migrant workers as an inferior tribe and dismiss them with the epithet of garbage people. These garbage people are in a kind of *displacement* that Nixon has described. Nixon (2011) indicates,

> A displacement, instead of referring solely to the movement of people from their places of belonging, refers rather to the loss of the land and resources beneath them, a loss that leaves communities stranded in a place stripped of the very characteristics that made it inhabitable. (p. 19)

These garbage people are not only displaced from their native place and culture but are also dislocated, officially resident within Guiyu and yet often elusively drifting away from Guiyu in search of better jobs and working conditions. Moreover, the migrant workers are exploited and bullied by the native urbanites, specifically the three major family enterprises. Language also becomes a vehicle for social alienation. The migrant workers speak Mandarin, while the native urbanites converse in the Guiyu dialect, which is largely unintelligible to outsiders. If

we were to argue that environmental degradation has had a negative impact on nature in this locale, then we could note that social stratification and human alienation have similarly worsened the condition of human beings in this locale. Segregation and alienation are manifest in the dispute between management, represented by the three local family enterprises, and labor, represented by the so-called garbage people. An uprising of the oppressed migrant workers finally breaks out after Mimi gets kidnapped by Luo Jincheng, the most powerful and wealthy person in the city. The uprising dramatizes a critical dimension of the environmentalism of the poor. The environmentally embattled migrant workers struggle with immediate survival, improvising from day to day and even from hour to hour. Luo and his fellow entrepreneurs have everything to fear from those garbage people who have nothing to lose. This uprising is "a historical moment when a chasm was opening between the exalted, gluttonous classes with their linguistic refinements and perfumed pretensions and the indigent masses for whom life was an hourly scramble for survival" (Nixon, 2011, p. 56).

The irony is that Luo's son had contracted the same viral infection from which Mimi suffers. Therefore, Luo kidnaps Mimi in order to perform a shamanistic rite that he hopes will cure his son. After having been transformed into a cyborg, Mimi performs a virtual operation in the son's brain, thereby altering the Broca area that is fundamental to speech production. Consequently, after the son recovers from the operation, he can no longer speak the urbanites' Guiyu dialect, but is fluent only in Mandarin, the tongue of all the garbage people. Stigmatized as alien and poor, the garbage people embody everything that the socially and financially privileged classes such as the Luo family seek to repress and banish. However, from then on, Luo's son's Mandarin will keep resurfacing as a discomfiting reminder of the limits to the social barriers that Guiyu's wealthy elite strives to uphold.

It is also through the cyborg Mimi that the novel's physical and virtual realities converge. The virtual reality is brought about by high technology and the Internet. The author presents a cyberpunk world in which young migrant workers imbibe cyber drugs and wear augmented reality glasses in order to seek pleasure and relaxation, which are absent from the reality of their daily lives. High-tech products such as robotic accessories and turbocharged exoskeletons assist the garbage people with their real-life hand-to-hand combat against forces of the evil management. Like the physical world, the virtual world is stratified and censored by the government. Guiyu is trapped within a low-speed Internet area (*di su qu*) as the government's punishment for a local Internet exposé about a migrant girl who had been raped by Guiyu urbanite hooligans. This low-speed Internet restriction is a metaphor for China's Great Firewall—its aggressive Internet censorship. It is through this metaphor that the author presents his vision of the Internet serving as a tool for rebelling against authoritarianism and pursuing the freedom of speech. The Internet might even be able to catalyze socio-political revolution. In order to escape an anticipated second kidnapping at the hands of Luo Jincheng, Mimi breaks through the low-speed restriction, terminates the official Internet service in Guiyu, and leads her fellow migrant workers to freely browse the Internet via a temporary and unofficial VSAT satellite communication system. This is the first time in their lives that the garbage people have asserted their authority over the native Guiyu urbanites. Information technology has thus enabled the garbage people to invert the social hierarchy and triumph over evil managerial forces symbolized by the urban boss Luo Jincheng.

On the other hand, the novel's ending reveals the author's deep concern about the dangers of overdependence on advanced technology. Mimi's transformation from an ordinary teenage girl to a cyborg with super intelligence conveys a cautionary message: environmental degradation compounded by technological development will likely transform human beings into a different species, or even bring about the eventual extinction of humankind. The novel repeatedly argues that a brain–machine interface represents the future condition of humankind. The omniscient narrator predicts that human history will be terminated by "a new kind of life which crosses the boundary between a living being and a machine" (Chen, 2013, p. 240). It seems that the author places his hope for a better outcome than this in humankind itself. When facing a natural disaster that threatens human life, human beings may be able to reunite. At the end of the novel, when a dangerous typhoon

ravages the region and floods the city, Mimi and the garbage people put aside their grudge against the urbanites and join together to rescue flood victims in Guiyu. The component of humanity within the cyborg Mimi is represented by Mimi Zero, while the machine component is represented by Mimi One. After the typhoon, Mimi Zero decides to destroy the machine component of herself. She requests Chen Kaizong to shoot her with an electromagnetic pulse gun so as to burn up the circuitry within her brain. She says, "I don't want to become a monster, nor do I want to kill people, and do not want to be a piece of experimental article" (Chen, 2013, p. 246). Right before Mimi One is destroyed, she warns that "this is just the beginning" of humanity's unavoidable future encounter with the posthuman (Chen, 2013, p. 246). Therefore, Guiyu's hazardous exposure inhabits a gray zone between the human and the posthuman.

Conclusion

The literary works that I have discussed in this essay deal with the themes of weather modification, land reclamation, terraforming, and waste recycling. These themes are all closely related to the country's modernization, its economic takeoff, and the rhetoric of building a powerful China. When discussing the environmental impact of massive dams in India, Nixon (2011) argues that the giant dams "are a kind of national performance art" (p. 156) because they are "icons of national ascent" and are associated with the "official, centripetal logic of national development" (p. 152). However, when we look at the destructive impacts of these dams on environment and people's livelihood, these dams are a "terrifying, centrifugal narrative of displacement, dispossession, and exodus" (Nixon, 2011, p. 152). Therefore, Nixon (2011) concludes that these massive dams represent monumentalisms of both national modernity and the apocalypse (p. 157). Similarly, water diversion projects, artificial rainfall, spatial and temporal expansion of the Earth as a response to population increase, and the extraction of precious metals from hazardous waste as depicted in Chinese speculative narratives showcase the technological, political, and economic development of the country. These phenomena are also very closely related to the Chinese government's policies at various historical junctures. During the 1950s and 1960s, the government's main focus in economic policy was to increase industrial and agricultural output to provide the populace with adequate food and material supplies for the continual strengthening of China's state socialist system. Chinese meteorological research also responded to this overarching goal by experimenting with generating artificial rainfall and using new technological innovations to reduce or even eliminate the impact of natural disasters. At the same time, Maoist political rhetoric magnified the importance of sheer willpower in achieving humankind's conquest of nature. Therefore, it is hardly surprising that many sf texts during the Mao Era dealt with the themes of changing natural landscapes and modifying local weather patterns to benefit agricultural production and raise the standard of living. By the early 1980s, however, environmental awareness emerged in some literary texts as a response to the government's failure to rein in the pollution of farmland and water resources. Some texts expressed skepticism for government projects in radical land reclamation and weather modification and explored various negative impacts of new technology on the environment and human health. This critical and reflective tone had a lot to do with the literary and intellectual spirit of the post-Mao cultural thaw, as well as with influence from the Western environmental writings that had been recently translated into Chinese as a result of the government's policy of increased openness to the West. From the late 1990s to the present day, the United Nations and the Chinese government have drafted and issued various treaties, laws, and agreements to respond to global warming and environmental degradation. Correspondingly, Chinese speculative texts such as *The Waste Tide* have explored various environmental issues such as the depletion of natural resources, the trans-continental shipment of plastic waste and electronic waste, and migrant worker's living conditions. These various concerns and actions amount to attempts to respond to negative and unanticipated effects of China's modernization drive during the post-Mao period. At the same time, these narratives form one set of what can be understood as an emerging body of Chinese fiction located firmly within the strata and sediment of the Anthropocene. They reveal an attritional violence of environmental degradation, climate change, and the consequential social and political problems that permeate so many of our lives.

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