Breathing Air with Heft: An Experiential Report on Environmental Law and Public Health in China

*—Erin Ryan**

This article explores the gritty intersections of daily life and environmental law in modern China, an industrial powerhouse still struggling to reconcile economic opportunity with breathable air, clean water, healthy food, and safe products. With comparative perspective on analogous challenges in the United States, it reports on these critical domestic challenges for China at a pivotal moment in its reemergence as a dominant world power. China's continued geopolitical rise may well hinge on its ability to respond successfully to the environmental causes of growing social unrest.

In 2011, in the midst of this maelstrom, I brought my husband, young son, and elderly mother to spend a year living in China while I taught American law and studied Chinese environmental governance as a Fulbright Scholar. In our small two-bedroom apartment, we lived like a typical Chinese family—with three generations and an only child—and we struggled with the environmental challenges that nearly all Chinese families manage, from boiling tap water to breathing some of the most polluted air in human history. The experience of

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teaching environmental law at the same time that we were experiencing the Chinese environment was alternatively wrenching and inspiring. Five years later, I returned to China to study the government's new efforts to combat the environmental degradation that has accompanied China's rapid industrial development, and to take stock of what had changed.

The article synthesizes these insights with unfolding regulatory efforts into a full exposition of the environmental challenges that preoccupy modern China. Drawing from the rich reservoir of ordinary life infuses the research here with writing that is as experiential as it is academic—not just the legal particulars of monitoring fine particulate air pollution, but also how life changes when you are physically immersed in those particulates day after day. It chronicles the experiences of living within China's increasingly polluted environment—without clean air, potable water, or faith that the products we encountered in the marketplace would not make us sick. It reflects on the ways that established environmental problems can foster newer ones, such as the paradoxical implications of poor water quality for the mounting waste management crisis. Yet it also describes environmental realms in which China regularly puts the United States to shame—such as its widespread investment in urban public transportation systems, its fuller-scale embrace of renewable energy, and the Chinese people's less resource-intensive lifestyles.

After this descriptive account, the article explores fundamental differences in American and Chinese environmental philosophy and evaluates the unique challenges each nation faces in moving toward sustainable governance. Finally, it balances my observations with parallel reflections from a Chinese lawyer about the environmental issues she encountered while living in the United States. Her observations remind us that while Americans can take pride in the innovations of environmental governance we once pioneered, we must also contend with ongoing legal and cultural hurdles to environmental protection and public health, including mounting indifference. I conclude with thoughts about what each nation can learn from the other, and the hope that sharing experiences like these will help bridge the cultural gaps we inevitably encounter in working together to resolve global environmental challenges.

I. INTRODUCTION

This article explores the gritty intersection of daily life and environmental law in modern China, an industrial powerhouse still struggling to reconcile economic opportunity with breathable air, clean water, healthy food, and safe products. With comparative perspective on analogous challenges in the United States, the article reports on these critical domestic challenges for China at a pivotal moment in its reemergence as a dominant world power. China's continued geopolitical rise may well hinge on its ability to respond successfully to the environmental causes of growing social unrest.

In 2011, in the midst of this maelstrom, I brought my husband, young son, and elderly mother to spend a year living in China while I taught American environmental law and studied Chinese environmental governance as a Fulbright Scholar. In our small two-bedroom apartment, we lived like a typical Chinese family—with three generations and an only child—and we struggled with the environmental challenges that nearly all Chinese families manage, from boiling tap water to breathing some of the most polluted air in recorded human history.[1] The experience of teaching environmental law at the same time that we were experiencing the Chinese environment was alternatively wrenching and inspiring, and I reported on it in both academic research and narrative journalism over the year.[2] Five years later, in 2016, I returned to China to study

[1] *See infra* Part V(B) (discussing Beijing's "Airpocalypse" of 2013-15, in which sustained particulate matter pollution exceeded previously recorded levels); Tom Phillips, *Airpocalypse Now: China Pollution Reaching Record Levels*, GUARDIAN (Nov. 8, 2015), https://www.theguardian.com/world/2015/nov/09/airpocalypse-now-china-pollution-reaching-record-levels (reporting on pollution levels in Shenyang exceeding those measured in Beijing).

[2] *See, e.g.*, Erin Ryan, *The Elaborate Paper Tiger: Environmental Enforcement and the Rule of Law in China*, 24 DUKE ENVTL. L. & POL'Y F. 184 (2014) [hereinafter Ryan, *Elaborate Paper Tiger*] (describing the state of environmental degradation and noting the groundbreaking 2014 amendments to the Chinese basic Environmental Law); *see also* Erin Ryan, *When Socrates Meets Confucius: Teaching Critical and Creative Thinking Across Cultures with Multilevel Socratic Dialogue*, 92 NEB. L. REV. 289 (2013) [hereinafter Ryan, *When Socrates Meets Confucius*]

the government's new efforts to combat the environmental degradation that has accompanied China's rapid industrial development, and to take stock of what had changed.[3]

This extended piece synthesizes these insights with unfolding regulatory efforts into a full exposition of the environmental challenges that preoccupy China, culminating with a parallel Chinese perspective on environmental challenges facing the United States. It chronicles the experience of living within China's increasingly polluted environment—without clean air, potable water, or faith that the products we encountered in the marketplace would not make us sick. It reflects on the ways that established environmental problems can foster newer ones, such as the implications of poor water quality (and the stream of products to cope with it) for the mounting waste management crisis. It considers how cultural differences across the Pacific can prompt distinctive environmental management choices.

Yet the article also reveals environmental realms in which China regularly puts the United States to shame—for example, its widespread investment in urban public transportation systems that allow cheap and convenient navigation by bus, subway, and light rail. Or China's fuller-scale embrace of renewable energy at every level—with a solar water heater on seemingly every roof and record investment in new regional supply. Or the national government's efforts to put a meaningful price on greenhouse gas pollution through experimental carbon markets in seven cities.[4] Not to mention Chinese people's less resource-intensive lifestyles, and their comparative willingness to make personal sacrifices for the greater good.

During my time in China, I learned a great deal about Chinese law and governance through traditional means of academic inquiry, but I discovered early on that many of the most valuable lessons came from the experience of ordinary life, and from a perspective most visiting American law professors will never have. Not many arrive with a toddler in tow, and even fewer with a dependent parent. Coming with a full family provided access to the foundations of every-day Chinese culture that an unattached visiting professor would never encounter—from full engagement with public education and health care to the

(discussing the adaptation of American legal pedagogy for Chinese cultural norms, and how the same modifications can improve reciprocal deficits in American law teaching); Erin Ryan, *China Environmental Experiences*, ENVTL. L. PROF. BLOG (2011-12), http://lawprofessors.typepad.com/environmental_law/2013/04/china-environmental-experiences-table-of-contents.html.

[3] *See* Ryan, *Elaborate Paper Tiger*, *supra* note 2.

[4] These plans were first outlined in China's Twelfth Five-Year Plan, governing from 2011 to 2015. QUANGUO RENMIN DAIBIAO DAHUI (全国人民表大会)[NAT'L PEOPLE'S CONG.], ZHONGHUA RENMIN GONGHEGUO GUOMIN JINGJI HE SHEHUO FAZHAN DI SHIERGE WUNIAN GUIHUA (中华人民共和国国民经济和社会发展第十二个五年规划) [THE TWELFTH FIVE-YEAR PLAN FOR NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT OF THE PEOPLE'S REPUBLIC OF CHINA] (2011), *translated at* http://cbi.typepad.com/files/full-translation-5-yr-plan-2011-2015.doc [hereinafter CHINA'S TWELFTH FIVE-YEAR PLAN].

cultural rituals of parenting and the intergenerational impacts of family planning. So in addition to my legal research, I began cataloging our day-to-day experiences of public health and the environment.

Drawing from this rich reservoir of ordinary life infuses the research here with writing that is as experiential as it is academic—not just the legal particulars of monitoring fine particulate air pollution, but also how life changes when you are physically immersed in those particulates day after day. No scholarly research could have prepared me for the differences in environmental conditions and perspective that I would encounter there, and even my university degree in Chinese culture and politics fell short. Indeed, one of my family's more common sentiments was that anyone who complains about excessive health, safety, and environmental regulation in the United States really ought to spend a year in China, to personally experience what life looks like without it. (Better still, they should bring their young children or aging parents, and then live with that responsibility.) Nevertheless, anyone feeling smug about environmental virtue in the U.S. should also spend a year in China—for compelling personal perspective on what American's lavish consumption habits really mean for the global environment.

The article distills these perspectives in ten parts. Part II establishes the context for these reflections by introducing the cast of characters, the U.S.-China Fulbright program, the city of Qingdao, where we lived, and the Ocean University Law School, where I taught. Part III reflects on how the universal challenges of environmental management are accentuated in China, drawing comparisons to the Rocky Mountain Arsenal National Wildlife Refuge in Colorado. Part IV delves into the experience of water pollution and the greater history of water management in China. Part V explores the lived experience of air pollution in China, sharing the story of how public pressure forced greater transparency in air quality monitoring in Beijing. Part VI reviews safety issues with Chinese food and consumer products, and Part VII explores the mounting crisis of waste management in China.

The final parts of the article explore contrasting features in U.S. and Chinese environmental lifestyles and worldview. Part VIII contrasts Chinese and American differences in the human relationship to nature. Part IX addresses the different challenges the United States and China face in moving forward on sustainability governance, considering their relationship to environmental stewardship, and the philosophical roots of some of these differences. Part X tells the story of our jarring return to the United States, with all the culture shock that accompanied our arrival in China, mixed with the particular shame that only cultural insiders experience.

Finally, Part XI appropriately balances my observations with parallel reflections from a Chinese lawyer about the environmental issues she encountered while living in the United States. Over the year she spent in the

American southeast, she witnessed the extravagance of the American lifestyle, our wasteful use of energy and other resources, and the inescapable prevalence of chemically washed, genetically modified, and hormonally laced food choices. Her observations remind us that while Americans can take pride in many of the innovations of environmental governance pioneered here, we must also contend with ongoing legal and cultural hurdles to sustained environmental protection and public health. Indeed, in the years since my 2016 return from China, the United States has been dialing back such regulation at the very moment China is stepping it up, leaving me to wonder whether the two nations are trading places on environmental leadership.

I conclude with thoughts about what each nation can learn from the other. To that end, I emphasize that my purpose in sharing this kind of work—informed as much by lived experience as academic research—is to better illuminate the occasionally surprising environmental perspectives on both sides of the Pacific. Protecting the global environment will take the entire global village, in which none of us has a monopoly on truth, and few can accurately imagine life in other villagers' shoes. My hope is that sharing experiences like these will help bridge the cultural gaps that we will inevitably encounter as Chinese and American partners work together to solve our shared environmental challenges.

II. CONTEXT: THE SETTING AND CAST OF CHARACTERS

To provide context for these observations about what it's like to plunge into China's modern-day industrial revolution as an American environmental law professor, I begin by introducing the essential cast of characters and the setting in which much of the story unfolds. On the American side, I introduce my family and the U.S.-China Fulbright program, including the moving pre-departure benediction we received from the State Department about the importance of our Citizens' Diplomacy mission. On the Chinese side, I introduce our adopted hometown and host university, and then I offer some descriptive detail about our experience of home and community, including the ongoing impacts of transformative economic development and the waning One-Child Family Policy.

A. From the U.S.: Me, Fulbright, and Family

To shed light on what we brought with us to the experience: I am a Caucasian American woman with curly brown hair, tall for an American and gargantuan for a Chinese. I was forty-one years old when I first arrived in China. For the previous twelve years, I had taught various kinds of environmental and natural resources law in the United States, in addition to property law, constitutional federalism, and negotiation. Twenty years before my arrival in China, I graduated from Harvard University with an undergraduate degree in East Asian

Languages and Civilizations, studying China as the later Deng Xiaoping reforms were unfolding.[5] In 2010, when the U.S.-China Fulbright program was seeking environmental legal experts with knowledge of China, I responded to the call and spent the following year as a Fulbright Scholar and Visiting Professor at the Ocean University of China in Shandong Province.

The Fulbright program, administered by the U.S. Department of State, is the U.S. government's flagship international educational exchange program, conferring competitive, merit-based grants for the purpose of facilitating international good will through educational exchange.[6] The U.S.-China Fulbright program, the oldest and largest of the Fulbright program, is designed "to provide opportunities for cooperation and exchange in educational fields based on equality, reciprocity and mutual benefit."[7] I was one of several Fulbright professors in China that year, each of us from different disciplines, ranging from law to journalism to mental health. We were each placed in separate institutions in different parts of the country, from the far northeastern province of Harbin to the far southwestern province of Kunming. We met together with our families at the beginning of our journey, and those of us who stayed the full year met once more in Xiamen between semesters, but otherwise we had little contact over the year.

The Fulbright program staff prepared us well for the journey, holding an orientation in Washington, D.C. a few months before we left the United States and then another in Beijing before we deployed to our individual Chinese institutions. We were schooled with lessons from the meaningful to the mundane, including the "Three Ts" that we should always avoid discussing (Taiwan, Tibet, and Tiananmen);[8] how to react should we come home to find a government official searching our things (answer: go back outside and wait politely for them to finish); not to eat any plant product that was not first boiled or peeled; and to bring a year's worth of antiperspirant from the U.S. (because equivalent products do not exist in China). In Washington, after a series of briefings about Chinese politics, we were given a parting benediction by Kurt

[5] Beginning in the 1970s and continuing through the early 1990s, Chinese Communist Party Chair Deng Xiaoping initiated a program of economic "Reform and Opening Up" in modern China. *See generally* EZRA VOGEL, DENG XIAOPING AND THE TRANSFORMATION OF CHINA (2013).

[6] *An Informal History of the Fulbright Program: The Laws Behind the Program*, U.S. DEP'T ST., BUREAU EDUC. & CULTURAL AFF., https://eca.state.gov/fulbright/about-fulbright/history/early-years (last visited Feb. 2, 2018).

[7] *Fulbright Program*, U.S. EMBASSY & CONSULATES CHINA, https://china.usembassy-china.org.cn/education-culture/academic-exchanges/fulbright-program/ (last visited Mar. 19, 2018) (highlighting that the program sponsors educators, researchers, professionals, and students engaging in study, research, and teaching in one another's countries).

[8] *E.g.*, David Volodzko, *China's Biggest Taboos: The Three Ts*, DIPLOMAT (June 23, 2015), http://thediplomat.com/2015/06/chinas-biggest-taboos-the-three-ts/ (explaining fraught discussion with foreigners of China's territorial claims to Taiwan and Tibet and the Tiananmen Square massacre of June 4, 1989).

Campbell, then Assistant Secretary of State for East Asian and Pacific Affairs. His message, which struck me profoundly at the time and stayed with me all year, went roughly as follows:

> You should all understand that what you are about to do is very important. Right now, the relationship between the United States and China is the single most important diplomatic relationship on earth. And to be clear, the most important moment in the U.S.-China relationship is right now, in *this* moment—not in 1949, not when Nixon went to China—it's right *now*. How our two nations decide to work together right now will determine more about the future of the world than any other relationship on the planet. And you see, what we have learned is that the most important way of building that relationship is not through what diplomats like me and my colleagues here at the State Department do. What we do is important too, but ultimately, the most promising way of building the kind of diplomatic relationship that we can all move forward with is through—well, you. And other people doing what you're about to do.
>
> Individual relationships. Individual points of personal contact. A thousand points of light—whatever you want to call it. The human relationships that you will all go out and build with your students, your neighbors, and the friends that you'll make—and that will then inform the relationships that each of them has with their own friends, family and neighbors—that is what is going to push things in the right direction as much as anything we can do here. That's why we're investing so much in this kind of citizen's diplomacy between our two nations. So never forget: what you're doing is very important.

I never did forget, and so in China, before I was anything else, I was always a cultural ambassador.

More importantly, so were my family members—each of whom had access to entirely different segments of society. I was joined in China by my husband, our 3-year old son, and my 73-year-old mother, each as white as me (although my blonde, blue-eyed, and practically transparent son is perhaps even whiter). My mother had previous experience in Asia and had immersed herself in Chinese, but my husband had no prior contact with either. My rusty Chinese was serviceable, my mother's became quite good, and my good-sport of a husband did his best. My son attended a local Chinese kindergarten where he was the only foreigner, and he quickly learned to speak Mandarin with a local accent that shamed my own, despite my years of previous study.[9] Not long after we

[9] In fact, my son learned Chinese with a Qingdao accent, which differs from the standard Beijing accent that I had been taught in college. When I would occasionally correct his accent on words in which the two differ, he would proudly protest: "Ni shuo Beijinghua; wo shuo Qingdao hua!" (Translation: "You speak in Beijing tongue, but I speak in Qingdao tongue!"). I soon stopped correcting him.

arrived, my mother and husband began teaching English in various contexts—to university students, business professionals, local housewives, and small children—so that by the end of the year, each of us was fully engaged in our new world.

It wasn't hard for us to remember our diplomatic mission, because most days really did feel like a chapter in a novel about cross-cultural exchange—and one that extended very powerfully in both directions. And in light of this, every day that we spent in China felt important.

B. In China: Qingdao and Ocean University

We were placed in Shandong Province in the city of Qingdao ("Ching-dow"), which lies on the northeastern coast of China at the feet of the Laoshan Mountains, directly across the Yellow Sea from South Korea. The Qingdao metropolitan area includes some nine million people[10]—comparable to some of the largest in the United States, but modest by Chinese standards, where mega-cities like Shanghai have more than twenty million residents.[11] Qingdao is a lovely place of disarmingly friendly people, complete with weather-worn mountains overlooking a peaceful sea. Home to several of China's biggest brands,[12] and among the ten busiest commercial shipping ports in the world,[13] it is also where the famous Chinese beer comes from ("Tsingtao" is just a different Romanization for "Qingdao").[14] The Tsingtao Brewery is a tourist draw for both Chinese and foreign aficionados, and the city is known as a place to enjoy fresh seafood and good beer year-round.

Of greater interest to us was Qingdao's reputation as one of the cleaner cities in China. Qingdao has won awards for green development and generally ranks among the less polluted cities in China.[15] In 2009, it was ranked as the most

[10] *Qingdoa Profile*, ASIA-PAC. ECON. COOPERATION CHINA 2014, https://web.archive.org/web/20161121213409/http://www.apec-china.org.cn/en/other_qingdao.htm (last visited Mar. 10, 2018); *Qingdao's population soars to 9 million*, CHINA DAILY (Feb. 13, 2015), http://www.chinadaily.com.cn/m/shandong/e/2015-02/13/content_19582180.htm.

[11] *Shanghai Population 2016*, COUNTRY DIG., http://countrydigest.org/shanghai-population/ (last visited Nov. 18, 2016).

[12] *Qingdao: A New Leap for the "Brand City"*, CHINA DAILY (Mar. 3, 2010), http://qingdao.chinadaily.com.cn/2010-03/17/content_9603972.htm (discussing Qingdao's accessibility as a port town and reporting on the success of its brand-driven economy).

[13] *Top 10 Busiest Ports in the World*, MARINE INSIGHT NEWS NETWORK (June 8, 2017), https://www.marineinsight.com/ports/top-10-busiest-ports-in-the-world/ (listing the Port of Qingdao at number nine, between Dubai and Rotterdam).

[14] *History*, TSINGTAO BEER, http://tsingtaobeer.com/history/ (last visited Nov. 18, 2016) (describing the establishment of the Tsingtao beer brewery in Qingdao).

[15] *About the International Carbon-Value Award*, WORLD ECON. & ENVTL. CONF., http://www.wec-wec.net/Award_info.aspx?type=1 (last visited Nov. 18, 2016) (announcing Qingdao Port as a winner of the first International Carbon-Value Award in 2011).

livable city in China by the Chinese Institute for City Competitiveness.[16] Specifically, it was the promise of Qingdao's relatively clean air that drew us away from the placements that visiting academics so often seek in Beijing or Shanghai, as we were concerned for the health of our son and my mother. Sadly, air pollution began to worsen in Qingdao the year we arrived, and conditions have deteriorated even more in recent years, reportedly the result of new inland industry and increasing automobiles emissions. Still, we felt we had won the placement lottery when we arrived, and all things considered, I doubt we could have been landed at a better host institution anywhere in China.

I was invited to teach at the School of Law and Political Science at Ocean University of China ("OUC"), one of China's key comprehensive universities administered directly by the Ministry of Education.[17] Ocean University had about 45,000 students and 3,000 faculty when we were there, and it ranked near the top 10% of universities nationwide.[18] The law school had an especially dynamic environmental program, offering master's and doctoral degrees and coordinating with seven research institutes addressing marine law, coastal zone management, sustainable development, and other relevant topics.[19] There, I taught a full schedule of American law courses to Chinese students while simultaneously researching Chinese environmental governance and generally learning about China the way all cultural ambassadors do—from the inside out.

I was the first western teacher to spend a year in residence at the law school, and I was welcomed by a supportive Dean, a warm faculty, and delightful students. Teaching them was uniquely gratifying because they were hungry for the kind of engaged and participatory teaching that is used regularly in American law schools but more rarely in China. As I discovered, most had never before been asked what they themselves think, or to work all the way through a doctrinal problem, or to question their instructors. They were exceedingly disciplined and hard-working, but my Socratic and participatory classes asked them to do something wholly foreign to their previous training, and we all learned from the experience.[20] Over the course of the year, I was also invited to

[16] Peng Qi, *List of Ten Most Livable Cities in China Issued*, CRIENGLISH.COM (July 9, 2009), http://english.cri.cn/6566/2009/07/09/2263s500163.htm; Jin Dan, *China's Best City to Live in Is Revealed - Guess Its Name?*, CHINA DAILY (June 15, 2016), http://www.chinadaily.com.cn/china/2016-06/15/content_25720928.htm (announcing in 2016 that Qingdao was once again named China's most livable city).

[17] *A Brief Introduction to OUC*, STUDY CHINA ADMISSION SYS., http://www.sicas.cn/School/108/Contents/110817084356805.shtml (last visited Nov. 20, 2016).

[18] *Facts and Figures*, OCEAN U. CHINA, https://web.archive.org/web/20160325135702/http://eweb.ouc.edu.cn/4103/list.htm (last updated Dec. 2015); *Best Chinese Universities Ranking: Overall Ranking—2015*, ACAD. RANKING WORLD U., http://www.shanghairanking.com/Chinese_Universities_Rankings/Overall-Ranking-2015.html (last visited May 15, 2018).

[19] *Academic Programs Overview*, OCEAN U. CHINA SCH. L. & POL. SCI., http://eweb.ouc.edu.cn/lps/wverview/list.psp (last visited Nov. 20, 2016).

[20] Ryan, *When Socrates Meets Confucius*, *supra* note 2 (describing the rewards and challenges

guest-lecture at twenty-five other universities and institutions in China and a few neighboring Asian countries, providing an even fuller comparative context.

C. At Home in the Neighborhood

The university provided us with housing in a neighborhood on one of three OUC campuses where university faculty live, this one near the coast. We were given a two-bedroom apartment on the first floor of a concrete, six-story walk-up apartment building that housed the "foreign experts"—mostly adjunct faculty brought there to teach foreign languages. It was surrounded by a development of some fifty similar buildings housing regular faculty, some of which appeared much older than ours. There was a small market in the middle of our compound where we could buy groceries, a small outdoor exercise park to help adults keep limber, and an open courtyard with two circular marble platforms on which neighborhood children would play. The neighborhood was bounded by busy market streets of shops, restaurants, and street vendors. Some sold food from carts; others sold clothing and electronics from blankets on the curb. Twice each week in the early morning, the open streets would briefly transform into a flash farmer's market, brimming with fresh produce and (occasionally live) meats, and leaving a daily stream of curbside farm refuse until it was eventually cleared by street cleaners.

Between campus and the waterfront, the neighborhood was in transition. One-story homes, produce markets, and fish vendors were interspersed with low and high-rise concrete buildings. There were several huge vacant lots, where old-style, traditional villages had been entirely cleared to make way for skyscraping luxury apartments with ocean views. Walking the streets revealed a characteristic mix of urban and rural life in China—a living contrast of old and new China itself—with electronics stores next to tethered goats foraging in the trash, and cages improbably filled with live chickens. Every so often, there was a large, standalone public restroom with facilities for older neighborhood homes that might not have indoor plumbing. There were banks and ATMs on nearly every corner, necessitated by the fact that the local economy is predominantly cash-based.[21] Credit cards were rarely useful outside of tourist areas, and cash was necessary even to pay school tuition and hospital bills. Indeed, when we arrived in Qingdao, we were advised to keep at least 3,000 Chinese yuan (roughly $500) at home at all times in case of medical emergency, as there would be no treatment without payment up-front.

Our 90-square meter apartment (just over 950 square feet) was modest by

of adapting the Socratic method for use in China as a means of inculcating critical thinking skills).

[21] David Barboza, *Chinese Way of Doing Business: In Cash We Trust*, N.Y. TIMES (Apr. 30, 2013), http://www.nytimes.com/2013/05/01/business/global/chinese-way-of-doing-business-in-cash-we-trust.html?_r=0.

American standards, but palatial by Chinese standards. It had a generous living room with a small table and chairs, a couch and coffee table, a desk, and a rabbit-antennae TV. By the end of the year, we had all taken up customary stations where we spent most of our time—my mother at the table, my husband on the couch, me at the desk, and my son on a mat in the middle of the floor. The two bedrooms were each big enough for two beds, a small table, and a portable wardrobe closet. Like many Chinese families, we used one bedroom for the parents and the other for the child and grandparent. Later that year, we acquired mosquito netting for the beds, because the first floor was particularly vulnerable to biting insects.

There was a small kitchen with just enough room for a sink, a small refrigerator (about half the size of the average American unit), a small microwave oven, and a few cabinets. Projecting from the kitchen was an even smaller but fully enclosed alcove for wok-cooking over an electric hotplate—enclosed to protect the rest of the apartment from the smoke and fumes of cooking oil heated in the wok. We acquired an additional hot plate so that we had two burners to work with, and we also bought a toaster-style oven, but not one that would allow us to set a specific temperature. Western-style ovens are not a conventional part of a Chinese kitchen.

There was also a small bathroom that was especially luxurious by local standards. Like most Chinese bathrooms, it had a sink and a washing machine, but ours not only had a western toilet, it also had an ample sink and enclosed shower. This was, for us, an especially precious feature of the apartment. At first, we had been placed in an apartment with a more conventional Chinese bathroom, with a tiny sink, a partly hand-operated washing machine, a solar water heater, and a shower head mounted on the wall—so that the entire room would become the shower at the appointed time. Our second apartment was more elaborate, with an entirely automatic washing machine and a backup electric heater that enabled us to take hot showers at any time of day. (I felt morally ambivalent about our additional use of energy, but grateful for hot showers in the late evening or early morning while working into the family shower line.)

Clothes dryers are not customary in China, so we hung wet laundry out to dry on a ground-level patio. This could take a long time in the cold winter months, and our clothes often smelled like air pollution by the time they were dry. But as clothes driers are notorious energy hogs, we drew comfort from our virtue while waiting endlessly for dry towels. The most beloved improvement in the new apartment over the old was that each bedroom had a small air conditioner of moderate effect, for which we were endlessly grateful during the heat and humidity of summer—though mindful that our gratitude further betrayed the energy-consumptive American lifestyle to which we were accustomed.

We never had a car in China, but we learned to use public transportation to

get where we needed to go. Every day, I took a half-hour, fully-packed bus ride from OUC's Fushan campus, where we lived, to the Laoshan campus where I taught (and as the bus was normally filled beyond capacity, I usually sat on the steps of the bus door). Each morning, my mother walked my son up the hill to his kindergarten, and one of us picked him up at the end of the day. Every weekend, we took a bus downtown or found a taxi across the city to buy groceries beyond those available in the neighborhood store, including foreign milk, cheese, and bread.

Whenever we could, we climbed the Fushan mountain behind our neighborhood and looked out over the sprawling city, or walked down the sloping hill until it met the beautiful Qingdao coast. We explored the city, and visited local zoos and museums. We indulged in local pleasures like karaoke, hotpot, and Chinese foot massage, and we spent lots of time with students who became close family friends.

D. Fitting In as a One-Child, Three-Generation Family

There were many ways in which we inevitably stood out in our adopted community, but one realm in which we fit surprisingly well into our environment was our family structure. Our only child and live-in grandmother made us very typically Chinese, especially in urban China.[22] My mother's accompaniment, which might have drawn comment in the United States, was completely ordinary in China. It is culturally expected that Chinese adults will care for their aging parents whenever possible (although the migration of rural workers to urban centers in search of jobs has complicated this tradition).[23] Dependent parents often live with their adult children, sometimes sharing a bedroom with their grandchild in the limited space of a typical urban apartment. When my mother walked my son to school each day, she joined a local army of other grandmothers leading grandchildren up the hill. When she took him to the marble circle to play, she was surrounded by other grandmothers watching over their only grandchild.

My son's sibling-less status—often a curiosity in the United States—also blended seamlessly into Chinese life. One-child families are omnipresent in urban China and common in rural China as the result of the One-Child Family Policy.[24] Beginning in the 1970s, China officially disallowed the birth of second

[22] *Cf.* Sun Ying, et al., *Chinese Ideal Family: Four Generations Under One Roof*, CONFUCIUS INST., http://confuciusmag.com/chinese-ideal-family (last visited April 24, 2018), (describing the traditional multi-generational Chinese family).

[23] *See, e.g.*, Jieyu Liu, *Ageing, Migration and Familial Support in Rural China*, 51 GEOFORUM 305 (2014).

[24] *See generally* MEI FONG, ONE CHILD: THE STORY OF CHINA'S MOST RADICAL EXPERIMENT (2016); *see generally* KAY ANN JOHNSON, CHINA'S HIDDEN CHILDREN: ABANDONMENT, ADOPTION, AND THE HUMAN COSTS OF THE ONE CHILD POLICY (2016). In rural China, the one-

children, in an effort to avoid the Malthusian predictions of famine by overpopulation that haunted China, especially after tens of millions starved in the aftermath of the Great Leap Forward's experiment with collective agriculture in the late 1950s.[25] Since then, most families have conformed to the limit, which was strictly (and sometimes brutally) enforced.[26] Early days under the policy saw forced abortions and second children forever denied access to public schools and health care, although more recently, families who could afford it have been able to flout the policy by paying steep financial fines.[27] Even in 2016, I found family planning billboards plastering rural Chinese public squares, with pictures of happy, one-child families above detailed instructional information about birth control.

The impacts of the One-Child policy have been decidedly mixed, for China in general, and Chinese women in particular. First and foremost, the policy appears to have accomplished its goal: China's population grew much more slowly than it otherwise would have since the 1970s, facilitating China's rapid economic development over that period.[28] Many observers have lauded the policy for reducing the impacts that growing populations have had on already scarce environmental resources, and forestalling the progression of climate change.[29] However, female infanticide and abandonment were widely practiced in rural areas, where sons were culturally preferred because they traditionally remain with their own families after marriage, while daughters join their husbands' families.[30] Chinese orphanages were filled with girls, tens of thousands of whom were adopted out of country.[31] On the other hand, women across China were given the benefit of parental investment and education that would almost certainly have gone to their brothers otherwise.[32] Many of my female students,

child policy eventually settled into one closer to one child if the first one is a boy, and two otherwise. *Id* at 2; *Five Things to Know About China's One-child Policy*, CBC NEWS (Oct. 29, 2015), http://www.cbc.ca/news/world/5-things-to-know-about-china-s-1-child-policy-1.3294335 ("Ethnic minorities were allowed more than one child, and five years after the policy was enacted, rural couples were allowed two children if their firstborn was a girl.").

[25] *See* JOHNSON, *supra* note 24, at 24; SUSAN GREENHALGH, CULTIVATING GLOBAL CITIZENS: POPULATION IN THE RISE OF CHINA 16-17 (2010) (discussing the origins of the policy).

[26] JOHNSON, *supra* note 24, at 106 (discussing forced abortions and other enforcement methods).

[27] *Id.* at 70–80, 96, 123.

[28] *See* GREENHALGH, *supra* note 25, at 111–12.

[29] *See, e.g.*, Sarah Conly, *Here's Why China's One-Child Policy Was a Good Thing*, BOS. GLOBE (Oct. 31, 2015), https://www.bostonglobe.com/opinion/2015/10/31/here-why-china-one-child-policy-was-good-thing/GY4XiQLeYfAZ8e8Y7yFycI/story.html (exhorting population control as a means of mitigating climate change).

[30] JOHNSON, *supra* note 24, at 40–45, 68.

[31] *Id.* at 59; Jeneen Interlandi, *The Benefits of International Adoption*, NEWSWEEK (Mar. 1, 2010), http://www.newsweek.com/benefits-international-adoption-69311.

[32] *See* Kristine Sudbeck, *The Effects of China's One-Child Policy: The Significance for Chinese Women*, 27 NEB. ANTHROPOLOGIST 43, 54–55 (2012) (discussing increasing parental

almost all of whom were only children, believed they might never have been able to attend university had the One-Child policy not been in force.

Moreover, while the One-Child policy was created to forestall disaster, it is now understood to have created a disaster of a different order—a looming economic crisis being forecast when pre-One Child generations retire.[33] In a society where children care for their elders, every young person born under One-Child is effectively providing for six generational elders, as the only offspring of two parents and four grandparents. By so dramatically reducing the birthrate, the policy has resulted in a depleted national workforce and emaciated family network that experts believe will be unable to support the Chinese equivalent (though vastly larger) of the aging American Baby Boom generation.[34]

For this reason, the One-Child policy was officially repealed in 2015 in favor of a Two-Child policy.[35] Even during our time there in 2011-12, the government had begun to allow second children in families where neither husband nor wife had siblings. But we were surprised to discover that, at least in our social circle, there were few takers. Some well-off families eventually took advantage of this new flexibility, but most of the people we knew—almost none of whom had grown up with siblings themselves—seemed uninterested. Between the demands of work, high cost of child-rearing, and cultural acceptance of only-child families, most of my friends and students seemed persuaded that one child was enough. The deep cultural penetration of this government-driven regulatory policy was staggering—and noteworthy. For better or worse, and as Part VIII will consider, the government's ability to prompt cultural change through policymaking could be important for China's accomplishment of future environmental goals.

Indeed, when I returned in 2016, two of my female friends had decided to have second children, but they were deeply preoccupied by the problems of work-family balance that are universally familiar to American working women—and there, without the cultural and familial support for multi-child families on which American women can draw. Chinese workplaces can be less flexible, and some friends and family less supportive. There are also distinct challenges in parenting multi-child families for which these women were completely unprepared. For example, both of my friends were distraught about the terrible behavior they saw in their older children toward the younger ones, worrying that it signaled deep character flaws or even mental illness in their formerly lovely only-children. With neither personal nor cultural experience of

investment in daughters under the policy).

[33] *See* Judith Banister, David E. Bloom & Larry Rosenberg, *Population Aging and Economic Growth in China*, *in* THE CHINESE ECONOMY: A NEW TRANSITION 114 (Aoki and Wu ed., 2010).

[34] *Id.*

[35] Chris Buckley, *China Ends One-Child Policy, Allowing Families Two Children*, N.Y. TIMES (Oct. 29, 2015), http://www.nytimes.com/2015/10/30/world/asia/china-end-one-child-policy.html.

multi-child families, they were unable to diagnose what the average American parent would instantly recognize as normal sibling rivalry.

In any event, during my family's year in China, we were so familiarly Chinese in structure that we enjoyed pleasant social contact with other neighborhood families that might have been less accessible otherwise. Yet in most areas of our lives, the year required constant adjustment for each of us, and newfound flexibility from within.

Even setting aside the environmental challenges that are the focus of this piece, our Americanness misfit our cultural surroundings in ways that could fill a book (and ideally, a joke book). Authoritarianism, corruption, and the malleability of professional planning were regular features of our interactions in China that we never really mastered. From our disorienting vantage point inside the Great Fire Wall, we witnessed the limited availability of information even as it was widely circulated on the Internet beyond it. We mass-ordered chewable Pepto-Bismol tablets from home, and awaited the four-month delivery while our package was searched at every level of distribution. We learned, by necessity, to use squat johns—though admittedly, never with the grace that a lifetime of practice endows.

We eventually learned to ride the wave of uncertainty that pervaded our lives, waking up every morning accepting that no matter what we thought was supposed to happen that day, it would probably turn out differently. Nevertheless, every day was an adventure, most days held some joy, and the local people were unfailingly kind to us—friends and strangers alike—in ways that forever touched our hearts.

E. Five Year Update: Transformative Development

In 2016, five years after we arrived in this context, I returned to China for a comparative environmental governance conference in Beijing, and then to guest-lecture back at Ocean University in Qingdao. In Beijing, Chinese and American academics discussed important 2014 amendments to Chinese environmental law,[36] all promising indicators that the Chinese government is undertaking more meaningful efforts to combat the environmental challenges that are the subject of this piece.[37] I was heartened to see these genuine signs of environmental progress and a clear commitment to regulatory change, discussed in more detail in Part IV.[38]

However, I was also distressed by further evidence of the mounting public

[36] *Zhonghua Renmin Gongheguo Huanjing Baohufa* (*中华人民共和国环境保 护法*) [*Environmental Protection Law of the People's Republic of China (Presidential Order Number Nine)*], CHINA (Apr. 24, 2014), http://www.gov.cn/zhengce/2014-04/25/content_2666434.htm; *see* Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 237-39.

[37] *See* Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 237–39.

[38] *See infra* notes 129–138 and accompanying text.

health crisis that has necessitated them. For example, the air quality in Qingdao seemed much worse than it had been when I left in 2012 (and this during the comparatively clean air days of summer). Qingdao was no longer the respite from air pollution that had drawn us there in the first place—although I noted that its particulate-laden air still had less of the familiar chemical tinge that I had just breathed in Beijing. Public protests over environmental harm had increased since my family's departure,[39] even as government tolerance for dissenting views had diminished.[40]

China's ongoing economic transformation had continued apace, and I also witnessed what that means for individual local communities. Much of the local neighborhood that I described above is now gone—replaced by tightly-packed rows of high-rise apartment buildings. The market street where my family shopped each day had been entirely cleared of the shops, restaurants, and vendors that had felt like family to us. Where there had been a mix of village and concrete, goats alongside electronics, now there is only urban jungle. OUC campus housing remained intact (for now), but the surrounding buildings are now far taller and more luxurious than the six-story model we lived in, their waterfront views commanding prices that can exceed comparably sized real estate in New York and San Francisco.[41] For these huge down-payments, Chinese homebuyers get only the concrete shell of empty space; all interior features—windows, flooring, cabinetry, plumbing, electrical, etc.—must be installed by each individual owner. And of course, Qingdao homebuyers don't receive full, western-style ownership—they get a 70-year lease to residential space, consistent with Chinese land policy, in which the government retains

[39] *See*, *e.g.*, Jennifer Duggan, *Kunming Pollution Protest is Tip of Rising Chinese Environmental Activism*, GUARDIAN (May 16, 2013), http://www.theguardian.com/environment/chinas-choice/2013/may/16/kunming-pollution-protest-chinese-environmental-activism (reporting that up to 80% of Chinese now believe environmental protection should take precedence over economic development); Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 193–96, 224–25, 232–33, 236.

[40] Ivan Watson et al., *No Escape? China's Crackdown on Dissent Goes Global*, CNN (Feb. 4, 2016), http://www.cnn.com/2016/02/04/asia/china-dissident-crackdown-goes-global/ (reporting on diminishing tolerance for dissent under Xi Jinping's administration).

[41] *See Mài dǎo hǎijǐng fang* (*麦岛海景房*) [*Maidao Seaview Room*], 58 HOME, http://qd.58.com/damaidao/haijingfang/e3h1k6/?PGTID=0d300000-0000-02a7-fc1c-8f8d813078b4&ClickID=1 (last visited May 23, 2018) (showing that at the time of publication, Qingdao coastal apartments of around 1,500 square feet in the Maidao area of the city were listing for upwards of $1,000,000 U.S.). By contrast, the median price of a Manhattan apartment was just under $1,000,000. Michelle Higgins, *Manhattan Apartment Prices Near Million-Dollar Mark, Reports Say*, N.Y. TIMES (Oct. 1, 2015), https://www.nytimes.com/2015/10/01/realestate/manhattan-apartment-prices-near-million-dollar-mark-reports-say.html (reporting a median price of $999,000). The average price is even lower for New York City as a whole, and for San Francisco. *See* Tanay Warerkar, *Manhattan's Average Price Per Square Foot Surpasses That of Other Major U.S. Cities*, CURBED N.Y. (Aug. 21, 2017), https://ny.curbed.com/2017/8/21/16179926/manhattan-average-square-foot-price (noting that Manhattan prices vastly exceed prices for New York City as a whole, prices for San Francisco, and other major U.S. cities).

underlying ownership of nearly all national land.[42]

It was surreal to discover that the parts of our old community that had felt so alive to us five years earlier had been completely removed, and all at once. There was no sign of the local restaurant that had been our home away from home, or the sidewalk socks vendor, or the fruit seller we had most befriended, Mr. Mu, who had laughed with my son every afternoon when we passed, even without the benefit of shared language. I asked my friends what had happened to the shopkeepers who had lived behind their shops or in the adjacent *hutong* village, a densely packed community of old-style, one-story homes. "They are gone now," came the answer. "Where did they go?" I asked. "Not clear." Some may have had a chance to relocate to new apartments being built in the area, and some may have been offered comparable apartments elsewhere, in less expensive parts of the city.

I asked if those who had been moved likely felt happy or unhappy about the change, and of course, the answer was complicated. I was told that some were probably very happy to trade their ramshackle homes, which may or may not have had utilities, for the kind of concrete apartment that we had lived in, with central heating and modern plumbing. On the other hand, an entire community had been uprooted and dispersed, a diaspora of personal and business relationships that may never be recovered. Others, I was told, felt that they were not compensated appropriately for their loss, considering how much the developer will now make from these luxury apartments, and how expensive it has become to find a comparable location.

The themes of this story echo those that we experience here in the United States, where the taking of private homes for local economic development remains extremely controversial.[43] But an important difference is that in China, the ability of private citizens to complain about it is much more circumscribed, by a confluence of cultural and political factors. Curious to probe this difference, I asked a taxi-driver what owners can do when they feel they have been insufficiently compensated for lost homes, and he responded that yes—this happens all the time. But when I pressed for what an owner or a community can actually *do* about that, the response was blank. What did I mean, "what can someone do?" When the government wants your land, came his response, what can anyone do?

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[42] Stuart Leavenworth & Kiki Zhao, *In China, Homeowners Find Themselves in a Land of Doubt*, N.Y. TIMES (May 31, 2016), http://www.nytimes.com/2016/06/01/business/international/in-china-homeowners-find-themselves-in-a-land-of-doubt.html.

[43] *See, e.g.*, Kelo v. City of New London, 545 U.S. 469 (2005); Poletown Neighborhood Council v. Detroit, 304 N.W.2d 455 (Mich. 1981). *See also* Charles E. Cohen, *Eminent Domain After* Kelo v. City of New London: *An Argument for Banning Economic Development Takings*, 29 HARV. J.L. & PUB. POL'Y 491 (2006).

F. On "De-Orientalizing" China

The descriptions and observations in this Part have set the stage for those that follow—but before beginning that journey, it is imperative to note that while this work threatens to "Orientalize" China by emphasizing points of difference,[44] the majority of our experience in China was one of commonality. We enjoyed a safe, happy year in a thriving community among family-like friends who—like us—wondered about the rest of the world, experienced moments of ennui, and strived for a better life. Just like average Americans, most Chinese take pride in their country, enjoy colorful national holidays, and struggle with balancing work and family obligations. They commute during rush hour and follow the local news. They tell funny jokes, and they laugh a lot. They worry about their children. They seemed to us more skillful in the kitchen than most Americans (or at least more so than us, which is admittedly a low bar). But otherwise, Chinese people are a lot like Americans—open, welcoming, and generally optimistic by nature.

Moreover, China has made such economic strides in recent years that it has risen from its former status as one of the world's most developing nations to join the ranks of the "middle income" countries.[45] It is not as uniformly wealthy as the richest nations of Europe and the United States (although there are now as many billionaires in Beijing as in New York[46]), but it is certainly no longer among the world's poorest nations. Americans of a certain age remember being told to eat their dinners gratefully, keeping in mind the poor starving children in China[47]—but today in China, children are told to eat their dinners gratefully,

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[44] *See generally* EDWARD SAID, ORIENTALISM (1978) (critiquing patronizing and fictionalized western depictions of cultural "otherness" in the east). Coined by Said, westerners engage in "Orientalism" when they discuss eastern cultures in clichéd ways that exaggerate differences and implicitly presume the superiority of Western cultures. *Id. See also* James D.J. Brown, *A Stereotype, Wrapped in a Cliché, Inside a Caricature: Russian Foreign Policy and Orientalism*, 30 POLITICS 149–59 (2010) (critiquing the "Orientalized" analysis of Russian foreign policy).

[45] *China Overview*, WORLD BANK, http://www.worldbank.org/en/country/china/overview (last updated Mar. 28, 2017).

[46] *See, e.g.*, Mohamed Madi, *There Are Now More Billionaires in Beijing than New York, Report Says*, BBC NEWS (Feb. 25, 2016), http://www.bbc.com/news/av/world-35664291/there-are-now-more-billionaires-in-beijing-than-new-york-report-says; Andrew Soergel, *Beijing: The New Billionaire Capital of the World*, U.S. NEWS & WORLD REP. (Feb. 24, 2016), http://www.usnews.com/news/blogs/data-mine/2016/02/24/beijing-passes-new-york-city-as-billionaire-capital-of-the-world; *but see* Katia Savchuk, *New York Is the City with the Most Billionaires, Not Beijing*, FORBES (Mar. 1, 2016), http://www.forbes.com/sites/katiasavchuk/2016/03/01/new-york-most-billionaires/#60d06c512565 (refuting the earlier claim, but establishing that both New York and Beijing have lots of billionaires).

[47] This is a variation on a theme that played out in countless American households, sometimes emphasizing starvation in China, sometimes Armenia, sometimes India. *See, e.g.*, Benjamin Wallace, *The Starving Children of China*, DUMB WHITE HUSBAND (Oct. 15, 2013), http://www.dumbwhitehusband.com/vs-starving-children-of-china/ ("As a parent, one of my key responsibilities is to make sure my kids clean their plate. Why? Because there are children staving in China, that's why. I know this from growing up. I'm sure you do as well."). References to starvation

while thinking of the poor starving children in Africa.[48] I offer my apologies here to the many millions of African children who are neither poor nor starving (and for all the inevitable oversimplifications of this equally unfair characterization), but the anecdote provides an indication of where China now sees itself in the world. Similarly, Americans who marvel about what life must be like under the authoritarian Chinese system may be interested to know that this is precisely what many Chinese think when they wonder what life is like in North Korea, which strikes them as an equally unimaginable place. These anecdotes reveal precarious cultural tropes all around, but also profound parallels. I share them not to validate the stereotypes they betray, but to show how cultural stereotypes move through historical stages of economic development (and what they reveal about their holders).

Today, with over three thousand years of proud cultural history and several recent decades of lightning-round economic development, China is far from a poor or backward country, though rural areas still lag far behind urban centers.[49] We lived in one of China's more modern cities, and we enjoyed both its ancient cultural accomplishments and the fruits of China's rapid economic progress since the difficulties of the post-revolutionary era. We learned about a culture that manages to be simultaneously orderly and dynamic, as elegant as it is chaotic. And of course, we also learned a great deal about ourselves, and about our own problematic, complex, and occasionally mystifying culture.

While our lives were endlessly exciting and educational in China, it is also true that the living was not always easy. Perhaps the most important lesson of all was to downsize from the American lifestyle and feel what it means to live a little more like the rest of the world—a sobering lesson indeed. We will always be grateful to the Fulbright Program, the Chinese Ministry of Education, and Ocean University for the opportunity to have shared our lives across cultural boundaries this way. Even so, the challenges of living in China—specifically,

in China were likely based on the Great Famine following the Great Leap Forward, China's experimentation with collectivized agriculture after the 1949 Revolution, in which as many as 45 million people starved to death. *See, e.g.*, Tania Branigan, *China's Great Famine: The True Story*, GUARDIAN (Jan. 1, 2013), https://www.theguardian.com/world/2013/jan/01/china-great-famine-book-tombstone.

[48] Today, Chinese parents are not the only ones to reorient the cliché toward Africa. *See, e.g.*, Tamara Brennan, *What's the Harm in Saying "There are Starving Kids in Africa" to Get Your Child to Eat His Veggies?*, ATTACHMENT PARENTING INT'L (Dec. 16, 2015), http://attachmentparenting.org/blog/2015/12/16/whats-the-harm-in-saying-there-are-starving-kids-in-africa-to-get-your-child-to-eat-his-vegetables/. And as problematic as the cliché may be, African child hunger remains an urgent concern. Bill Gates, *Why Does Hunger Still Exist in Africa?*, GATES NOTES (Aug. 12, 2014), https://www.gatesnotes.com/Development/Why-Does-Hunger-Still-Exist-Africas-Table-Day-One (noting that starvation is no longer the concern it once was for African children, but that 40% of sub-Saharan African children suffer stunted growth as a result of being malnourished).

[49] Kerry Brown, *A Tale of Two Chinas: The Deep Divide Between Urban and Rural China*, ASIA & PAC. POL'Y SOC'Y (Mar. 29, 2016), https://www.policyforum.net/a-tale-of-two-chinas/.

the environmental challenges—could be harrowing. Fully acknowledging that part of the challenge was our own culture shock at leaving the familiar, I share some of these challenges below.

To that end, my last caveat is to acknowledge that the cross-cultural observations I share here say every bit as much about me and my own western perspective as they do about anything relating to the eastern culture they address. Some of my reflections are so clearly situated from within entrenched American biases that I have struggled, sometimes openly in the writing, over whether it is fair or helpful to even share them at all. In these moments, I hope that my decisions to hold forth err on the side of cross-cultural exchange in which the outside perspective can sometime reveal a truth that is invisible to those within. On the other hand, I write with the unsettling awareness that as a cultural outsider, there are just as likely to be instances in which I have simply and entirely misunderstood. Hopefully, the wheat will be sorted from the chaff in the ongoing discourse, by which two great civilizations continue to learn from one another.

III. THE TALE OF THE FIVE-LEGGED FROGS

In 2011, I was invited to Ocean University specifically to teach American environmental and land use law. Like every good teacher, I learned as much from my students as they did from me during our time together, but one such moment particularly clutched at my heart early on. This moment of exchange with a student in my Natural Resources Law class, as well as the building blocks leading up to that moment, would frame my project as a teacher and co-learner throughout the year.

A. Rocky Mountain Arsenal

I normally begin the course by exploring exactly what it is that we are trying to accomplish by environmental and natural resource management. To that end, I introduce work by environmental historian William Cronon about the contrasting assumptions different people hold about "nature" and the meaning of "natural."[50] In particular, I like to draw on a compelling thought experiment he proposes involving the Rocky Mountain Arsenal in Colorado.[51]

Not far from Denver, the Rocky Mountain Arsenal is now a popular National Wildlife Refuge visited by birders, fishers, and hikers—but before that, the land was used to manufacture chemical weapons.[52] The site had become so toxic after

[50] WILLIAM CRONON, UNCOMMON GROUND: TOWARD REINVENTING NATURE, 200, 248, 278-299 (1995) (discussing common cultural metaphors for nature).

[51] *Id.* at 27–28.

[52] *Rocky Mountain Arsenal*, U.S. FISH & WILDLIFE SERV., http://www.fws.gov/refuge/rocky_mountain_arsenal/ (last updated Feb. 22, 2018).

decades of mustard gas, napalm, and other chemical weapons production that it was sealed off from human contact for years after the weapons plant's closure in 1992.[53] However, this respite from human intervention provided an unanticipated haven for displaced wildlife, just as increasing swaths of Rocky Mountain forest were felled to make way for suburban development.[54] In this way, the Rocky Mountain Arsenal gradually evolved into what Cronon calls the nation's "most ironic" wildlife refuge.[55] Wildlife driven out of the developing Colorado front-country was able to establish undisturbed habitat on the arsenal grounds, notwithstanding its toxic soils and contaminated waters.[56] If the frogs there grew to have five legs, at least those frogs had wetlands to live in.

After sharing the early parts of the story with my Chinese students, we debated the difficult questions posed by Cronon and the authors of our textbook[57]—how would they manage these lands, if it were up to them? What would be most faithful to the goals of natural resource management? What would best protect "nature" as they saw it? Would they initiate the massive disruption required to decontaminate the very earth underfoot, even though it would harm a lot of resident wildlife? Or would they leave the five-legged frogs alone to live out their happy if shunted lives, peacefully unaware of the toxic soup in which they live? Raising these issues began a lively conversation that continued pleasantly and provocatively in our classroom for the rest of the semester.

B. Ignorance and Bliss

But over those same months, several of these students became involved in my family's experience of navigating the environmental challenges of our new life in China. For example, one of these students had been with us on the day that we arrived at OUC, helping us settle into our first apartment. An environmental law major with impeccable English and equally impeccable manners, he was fiercely proud of his homeland, and he went to great lengths to help us feel comfortable there. But in that first apartment, there were large flakes of paint peeling from every wall, window, and doorway. They collected in piles on the floor no matter

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[53] *Id.*

[54] *Cf.* W.E. Riebsame, H. Gosnell & D.M. Theobald, *Land Use and Landscape Change in the Colorado Mountains I: Theory, Scale, and Pattern*, 16 MOUNTAIN RES. & DEV. 395 (1996), https://ceoas.oregonstate.edu/people/files/gosnell/RiebsameGosnellTheobald_0.pdf (discussing sprawl residential development in formally rural and agricultural lands of the Rocky Mountain Front Range).

[55] CRONON, *supra* note 50, at 27, 59.

[56] CRONON, *supra* note 50, at 66 (noting, for example, resident populations of endangered Bald Eagles and ferruginous hawks).

[57] These Cronon materials are nicely excerpted in the Natural Resources Law textbook that I use: JAMES RASBAND, JAMES SALZMAN & MARK SQUILLACE, NATURAL RESOURCES LAW AND POLICY 4-9 (2d ed. 2009).

how often we swept, beckoning my three-year-old like so many giant, lightly-sweetened corn-flakes. We were very aware of the U.S. scandal involving lead-paint in some Chinese toys,[58] so my very first question to the student helping us was about the flaking paint and whether I should worry about lead poisoning. "Why?" he asked, blankly.

My concerns did not seem to register, even after I resolved all translation issues and politely gestured to the associated problem of lead paint in toys. My next approach was to try and find out what kind of paint had actually been used in the apartment, but that seemed like an equally strange question to him. Why did I care so much about paint? He assured me earnestly that children all over China grow up without incident in identical apartments, painted with the same kind of paint, whatever it was. (Between this and the problematic plumbing, we did not last long in that apartment.)

In these first few weeks, I often traveled by bus with my students on congested area highways, learning to navigate the city. Sometimes, I would feel overcome by the thick fumes of loosely regulated auto-emissions, but my students were so accustomed to this that they hardly noticed. When I commented on the smoky, foul-smelling air, they assured me that Qingdao is a coastal city, and that this was just ocean fog.[59] Having lived in coastal cities most of my life, however, I felt quite familiar with the difference between fog and smog. Fog is wet, I would say, and it doesn't sting your eyes or your throat. "You can feel this in your eyes?" they would ask, incredulously.

Over lunch one day, we discussed the U.S. Environmental Protection Agency's newly promulgated Mercury Rule, and I explained how it was designed to reduce toxic emissions by coal-fired power plants.[60] But none of my students had ever heard of the relationship between mercury and coal-fired power plants, even though we could see the smokestacks of three different coal-fired plants belching furiously into the air just from where we were sitting.

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[58] *See, e.g.*, Eric S. Lipton & David Barboza, *As More Toys Are Recalled, Trail Ends in China*, N.Y. TIMES (Jun. 19, 2007), http://www.nytimes.com/2007/06/19/business/worldbusiness/19toys.html?pagewanted=all&_r=0 (discussing the recall of 1.5 million trains and components that were coated with lead paint); JUDITH SHAPIRO, CHINA'S ENVIRONMENTAL CHALLENGES 38 (2012) (discussing health hazards from lead paint-coated toys from China).

[59] *Cf.* Clifford Coonan, *Beijing Is Left Fighting for Breath as Pollution Goes Off the Scale*, INDEPENDENT (Jan. 29, 2013), http://www.independent.co.uk/environment/green-living/beijing-is-left-fighting-for-breath-as-pollution-goes-off-the-scale-8471743.html (noting that "[f]or years, the Chinese government insisted on referring to the smog as 'fog' and released unrealistically low air-quality readings.").

[60] *See Mercury and Air Toxics Standards: Cleaner Power Plants,* U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/mats/cleaner-power-plants (last updated June 12, 2017); National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units, 77 Fed. Reg. 9304 (Feb. 16, 2012) (to be codified at 40 C.F.R. pts. 60 and 63) [hereinafter NESHAP Final Rule for Power Plants].

"Chinese coal doesn't have any mercury," one confident student assured me.

Later that fall, our apartment became infested with biting insects that ravaged us at night until my son looked like a smallpox patient for all his scratched-open sores. Some bites were so intense that our fingers would swell up and go numb, and we were afraid to go to sleep. After two weeks, we were so visibly haggard that my sweet students decided to try and help us resolve the problem. The solution was obvious to them: we just needed to douse the apartment with successive rounds of pesticide until whatever was preying on us was gone. They even took the initiative of contacting our building manager, securing a promise to begin fumigating the next day. The solution was so simple that they were astonished by our polite but strident refusal to allow it.

Although we were desperate to be rid of the pests, we were even more concerned about the potential poisons used to eradicate them.[61] One professional hazard of my trade is knowing too much about the harms environmental laws are designed to prevent, including the neurological consequences of organophosphate pesticide overexposure.[62] We had already puzzled our hosts by declining the aerators routinely used in homes to control mosquitoes—opting for minor suffering (in a non-malarial area) over the unknown consequences of an inhaled pesticide that we could not research in English. Our kind hosts were now offering to deliver us from misery, but we knew that some Chinese pesticides were harmful,[63] and we couldn't evaluate the safety of the fumigant that would be used in our apartment. In the U.S., we had avoided pesticides after our son's brush with infant seizures, and this did not seem like the time to shed precautions. But how could we explain this to our friends, for whom pesticides were a regular, widespread, and unquestioned part of life? Especially when they were trying so generously to come to our aid?

I finally just had to insist on our refusal, acknowledging that it must seem unreasonable to the average Chinese family, who would simply fumigate and forget. I explained a little bit about my son's medical history, noting that we were probably even more cautious than the average Americans. But I also mentioned the concerns raised by public health advocates around the world about the negative consequences of introduced chemicals in the environment,

[61] *E.g.*, Robert Repetto & Sanjay S. Baliga, *Pesticides and the Immune System: The Public Health Risks*, WORLD RESOURCES INST. (Mar. 1996), http://www.wri.org/publication/pesticides-and-immune-system.

[62] *E.g.*, SK Rastogi et al., *A Study of Neurologic Symptoms on Exposure to Organophosphate Pesticides in the Children of Agricultural Workers*, 14 INDIAN J. OCCUPATIONAL ENVTL. MED. 54 (2010), http://www.ijoem.com/article.asp?issn=0973-2284;year=2010;volume=14;issue=2;spage=54;epage=57;aulast=Rastogi (noting that self-poisoning by organophosphate pesticides kills an estimated 200,000 people in the developing world every year).

[63] *E.g.*, *Avoid Illegal Household Pesticide Products*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/safepestcontrol/avoid-illegal-household-pesticide-products (last updated Dec. 18, 2017) (discussing the serious health impacts of overexposure to chemicals in insecticide chalks, such as those commonly used in China).

including pesticides, and especially on young children.[64] I explained the efforts many Americans make to limit children's early exposure to potentially dangerous substances in pesticides,[65] cleaning products,[66] and even plastic baby bottles.[67]

In the end, with a little creativity and help from our friends, we found a non-toxic solution to our pest problem, for which we were deeply grateful.[68] But a few days later, one of my favorite students approached me before class, initiating a conversation that would haunt me for the rest of the year.

C. The Burden of Environmental Education

I was busy shuffling my notes when he came to the front of the class to tell me, hesitatingly, that he had continued to ponder the pesticide situation—and also the eye-stinging air pollution I had once mentioned, and the peeling paint in our first apartment. This was the same student who had assured me not to worry about lead paint, and one of many who regularly assured me that the smoky Qingdao air was nothing more than coastal fog. "I cannot stop thinking this," he said quietly. And then in hushed but earnest tones: "China is the Rocky Mountain Arsenal, isn't it?"

Confused by the analogy, and concerned by the pathos in his question, I stopped what I was doing and asked him what he meant. "Not a perfect comparison, I know, but really, the same situation—right? The environment is fouled, and we are like those frogs. We don't even know it, do we? That we live in a toxic world?"

My jaw slowly dropped as I tried and failed to form words. He looked at me steadily, with a profound but quiet pain behind his eyes. I hated the comparison he was drawing between China and a toxic waste site. I especially hated hearing

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[64] *See, e.g.*, *Emerging Chemicals of Concern*, CAL. DEP'T TOXIC SUBSTANCES CONTROL, http://www.dtsc.ca.gov/assessingrisk/emergingcontaminants.cfm (last visited Nov. 20, 2016) (listing resources documenting the negative effects of pesticides and other contaminants on human health).

[65] *E.g.*, *Information for Child Care Providers About Pesticides/Integrated Pest Management*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/childcare/information-child-care-providers-about-pesticidesintegrated-pest-management (last updated Jan. 19, 2017); *Children Are at Greater Risks from Pesticide Exposure*, U.S. ENVTL. PROTECTION AGENCY (Jan. 2002), https://archive.epa.gov/pesticides/regulating/laws/fqpa/web/html/kidpesticide.html.

[66] *See, e.g.*, R. Morgan Griffin, *Keeping Your House Clean Without Harsh Chemicals*, WEBMD (Aug. 26, 2010), http://children.webmd.com/environmental-exposure-head2toe/safer-cleaning-products?page=1 (explaining how various household cleaners can negatively impact children's health).

[67] *See, e.g.*, Amanda Gardner, *Report Shows Dangerous Chemical Can Leach from Baby Bottles*, ABC NEWS (Mar. 23, 2008), http://abcnews.go.com/Health/Healthday/story?id=4510374&page=1 (reporting on calls to ban BPA, a plastic additive, in baby bottles and sippy cups).

[68] We ultimately managed the problem by hanging mosquito netting over our beds, using packing tape to seal the air spaces around our windows and doors, and deploying an electric "bug zapper" to attract and electrocute those that got in despite these precautions.

it from this brilliant student, so proud of his country's accomplishments, and so protective of the many ways that it differs from the country I was teaching him about. He persisted: "I suppose it is better to know?" Still speechless, I nodded gently, to acknowledge the part of the comparison that tragically held some truth. I mumbled something semi-coherent about similar problems happening worldwide, and then I politely turned away to ready my notes for class (although mostly, it was so that he would not see me brush away the wetness from the corners of my eyes).

This simple question broke my heart. My student was right, of course—and in varying degrees, his observation really does hold true for all of us. But in that moment, the last thing I wanted was for my teaching to make him feel ashamed of his country, or betrayed by his government, or panicked about the future—or, really, anything other than just a little more educated than he had been the day before.

This was my first crisis of conscience while teaching in China. My student was that much more educated now, and this is what I had come to do. I was in China to teach environmental law, after all, and environmental awareness is a necessary part of the process. Yet in so doing, I found myself surprisingly and repeatedly torn. In sharing with my students some of the ways that I saw the world, I necessarily forced them to see theirs a bit differently—and it was not always for the best. To be sure, our educational exchange worked in both directions, and that student reminded me that all of us are living in the Rocky Mountain Arsenal to some extent. But my Chinese students would no longer believe that the smoky air was fog, and I was sad to know that they would now worry for their children in a way that their neighbors might not. They would worry about mercury poisoning, and lung cancer, and pesticides that others take for granted.

And worst of all, I realized—they would feel powerless to change it, at least for now. Unlike my American students, my Chinese students won't be able to just run for office to change the environmental policies that have led to this situation. They can't meaningfully vote their policy preferences at the ballot box. Raised by parents who lived through the events of Tiananmen Square, most were reluctant to protest in public, or even to raise their voices in opposition to public policy in the press, or even in academic papers. If they try to bring environmental lawsuits as lawyers, their suits may or may never be heard in court.[69] Without genuine levers of participation in governance, there really is some bliss to be had in ignorance.

My students' lost environmental innocence was cause for grief, especially when it brought pain without obvious remedy. As midwife for this loss, I shared

[69] Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 193, 205, 213–221, 235 (discussing judicial hurdles for environmental claims).

in that grief. All I could do was to cherish the hope that it will one day be a reason for celebration, when—thanks to their own generation's rising consciousness and promising developments in Chinese environmental law—the air no longer stings. If nothing else, I hope that my students will have that much more fire in their bellies, as their bellies are increasingly well-fed, to protect the next generation more effectively. And on that front, knowing even this small sample of young Chinese people filled me with confidence.

IV. WI-FI WITHOUT POTABLE WATER

Air pollution is usually the first environmental concern that people associate with China, but for us, the first and hardest adjustment would be the changed relationship we had to forge with water.

The adjustment suggests a surprising paradox in China's developmental miracle—a seemingly contradictory set of stones in China's path toward increasing prosperity and world power. By now, the China model of economic development has received world renown, and it deserves enormous credit for lifting hundreds of millions from poverty.[70] China's is among the fastest-growing economies on the planet, the second largest economy of all nations, and one of the largest exporters and importers in the world.[71] It is a nation with some 500 million Internet users,[72] 100 million cars,[73] and the world's largest standing army.[74] It is the third nation on earth to independently launch a successful manned space mission,[75] the first to launch a quantum communications satellite

[70] *Towards the End of Poverty*, ECONOMIST (June 1, 2013), http://www.economist.com/news/leaders/21578665-nearly-1-billion-people-have-been-taken-out-extreme-poverty-20-years-world-should-aim (noting that China pulled 680 million out of "misery" from 1981-2010 and reduced extreme poverty from 84% to 10% from 1980-2013).

[71] *See, e.g.*, Charles Riley, *India's Economic Growth Is Still the Envy of the World*, CNN MONEY (Aug. 31, 2016), http://money.cnn.com/2016/08/31/news/economy/india-economy-gdp-narendra-modi/ (noting that India and China are the world's two fastest growing large economies); *China Profile—Full Overview*, BBC NEWS (Jan. 21, 2016), http://www.bbc.com/news/world-asia-pacific-13017879 (noting that China, among the world's largest exporters, overtook Japan in 2011 as its second-largest economy); *The World Factbook 2017—Country Comparison: Imports*, U.S. CENT. INTELLIGENCE AGENCY (2017), https://www.cia.gov/library/publications/the-world-factbook/rankorder/2087rank.html.

[72] Jessica Phelan, *China's Internet Users Top 500 Million*, PUB. RADIO INT'L (Jan. 11, 2012), https://www.pri.org/stories/2012-01-11/chinas-internet-users-top-500-million.

[73] *Number of Cars in China Hits 100m*, CHINA DAILY (Sept. 17, 2011), http://www.chinadaily.com.cn/bizchina/2011-09/17/content_13725715.htm.

[74] Simon Denyer, *China's Slowing Economy Leads to Smallest Increase in Military Spending in Years*, WASH. POST (Mar. 4, 2016), https://www.washingtonpost.com/world/china-military-spending-growth-slows-in-line-with-economy-army-downsizing/2016/03/04/5c3686ab-b483-4f7d-86b2-77125c67dd4c_story.html (noting that, despite slowing military spending, China's 2-million-member force is still the world's largest standing army).

[75] Jamie A. FlorCruz, *China Rockets Forward in Race to Moon*, CNN (Mar. 9, 2012), http://edition.cnn.com/2012/03/08/world/asia/florcruz-china-space/index.html (noting that China is the third nation, after the U.S. and Russia, to dock capsules in space and detailing China's future

that may revolutionize global communications technology,[76] and with plans to send astronauts to the moon in the coming years.[77] At least in urban areas, China is a thoroughly modern, explosively developing place—with department stores selling Prada, goofy reality TV, and Wi-Fi at the local tea house (and in some cities, the local Starbucks).

And yet—notwithstanding all these blinding indicators of modernity—you still can't drink the water.

A. Boiled, Bottled, or Bellyache

Everyone in China knows (and visitors are carefully warned) that tap water is not potable and must be boiled thoroughly before consumption.[78] Every hotel room has a small water boiler for this purpose, and the more expensive ones provide a nightly bottle of safe drinking water by the bedside.[79] Water quality problems have long been associated with the continuing use of traditional "night soil"—human and animal waste—to fertilize crops, an effective and inexpensive alternative with an inexhaustible supply.[80] (Indeed, in rural areas, we sometimes saw old-style, elevated squat johns conveniently positioned near croplands, efficiently positioning excrement for adjacent agricultural use.) Yet these problems continue even as farmers embrace more modern chemical fertilizers—perhaps too heartily, at the alarming expense of soil health[81]—and as other contaminants enter the water supply.

In a modern city like Qingdao, water is provided from reservoirs to

space plans).

[76] Normaan Merchant, *China's Launch of Quantum Satellite Major Step in Space Race*, PHYS.ORG (Aug. 16, 2016), http://phys.org/news/2016-08-china-quantum-satellite-major-space.html.

[77] *See* FlorCruz, *supra* note 75; Edward Wong & Kenneth Chang, *Space Plan from China Broadens Challenge to U.S.*, N.Y. TIMES (Dec. 29, 2011), http://www.nytimes.com/2011/12/30/world/asia/china-unveils-ambitious-plan-to-explore-space.html?pagewanted=all&_r=0 (discussing China's plan to build a space station and put an astronaut on the moon). In late 2013, China landed its first unmanned spacecraft on the lunar surface. Sophie Brown, *Chinese Moon Rover Launched Successfully*, CNN (Dec. 14, 2013), http://www.cnn.com/2013/12/14/world/asia/china-moon-landing/.

[78] *See, e.g.*, *Drinking Water in China*, TRAVELCHINAGUIDE, http://www.travelchinaguide.com/essential/water.htm (last visited Nov. 20, 2016) (warning travelers that "tap water in China is undrinkable before it is boiled").

[79] *Id.* (discussing water protocols in Chinese hotels).

[80] *See, e.g.*, *Case Studies: Using Human Manure ("Nightsoil") in the Tai Lake Region of China*, AGROECOLOGY RES. GROUP, https://web.archive.org/web/20161223032412/http://www.agroecology.org/Case%20Studies/nightsoil.html (last visited Mar. 9, 2018) (explaining the Chinese practice of using human manure as fertilizer); Rose George, *The Big Necessity*, SLATE (Oct. 10, 2008), http://www.slate.com/articles/health_and_science/green_room/features/2008/the_big_necessity/in_one_end_and_out_the_burner.html (discussing the 4000-year history of China's use of nightsoil and its positive impacts on soil quality).

[81] Natasha Gilbert, *Acid Soil Threatens Chinese Farms*, NATURE (Feb. 11, 2010), http://www.nature.com/news/2010/100211/full/news.2010.67.html (discussing the growing use of chemical fertilizers in China since the 1980s and its negative effects on soil quality).

apartments through indoor plumbing, transported in by underground water mains and out by a city-wide network of sewer lines. On the surface, the water system looked a lot like what we were used to in the U.S. (though our first apartment lacked hot water in the kitchen, and in the second, it ran out very quickly). But in rural China, where water delivery is less developed, people continue to rely on wells, public pumping stations, and networks of open aqueducts. In parts of Western China, I saw open canal systems mixing water delivery and sewer uses. For example, in the ancient city of Lijiang in Yunnan Province, I rose for an early morning walk to find cooks cleaning the carcasses of recently killed animals, intestines and all, directly into the curbside canals from which residents also draw household water.[82] Water delivery in Qingdao was much more modern, but even so, animal entrails and other waste was liberally scattered on the streets after the daily farmers' market dispersed, and so many of the same bacterial remnants were washed into local streams and reservoirs with each rainfall.

Especially in parts of China without primary sewage treatment, concerns about waterborne disease are well-founded.[83] In 2008, some 327 million people in China still lacked access to formal drinking water delivery, and 535 million—more than the entire population of the United States—lacked access to improved sanitation.[84] A 2012 study found that the lack of modern water treatment leads to hundreds of millions of cases of diarrheal, parasitic, and other infectious diseases, including helminthiasis and schistosomiasis from exposure to contaminated soil and water.[85] This study estimated that unsafe water and sanitation conditions accounted for 62,800 deaths that year, mostly among China's poor inland provinces, and that children under five years experienced more than 80% of the disease burden.[86]

In fact, shortly before we departed for China, we were warned by an American vaccination nurse only to sponge-bathe our 3-year-old, rather than risk his inadvertent exposure to waterborne parasites that might enter his open eyes or mouth in a shower. Once we had arrived, we quickly decided that this level of precaution was unnecessary, at least in urban areas like Qingdao, where the municipal water supply receives some disinfection before reaching the tap.[87]

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[82] *Lijiang Old Town—The World Cultural Heritage*, CHINA ODYSSEY TOURS, http://www.chinaodysseytours.com/yunnan/lijiang-old-town-photo-tour.html (last visited Nov. 20, 2016) (describing the Lijiang canal system that reaches every street in the town).

[83] *See generally* CHRISTINE E. BOYLE, WATER-BORNE ILLNESS IN CHINA (2007), https://www.wilsoncenter.org/sites/default/files/waterborne_Aug07.pdf.

[84] *See* Woodruff Health Scis. Ctr., *China: Significant Disparities in Disease from Unsafe Water and Sanitation, Study Shows*, EMORY U. (Aug. 2, 2012), http://news.emory.edu/stories/2012/08/jj_china_sanitation_water_study/.

[85] *See Id.*

[86] *See Id.*

[87] *E.g.*, U.S. DEP'T OF COMMERCE INT'L TRADE ADMIN., WATER SUPPLY AND WASTEWATER

Concerns about water contamination are even more relaxed in Beijing, where municipally treated water has been held to World Health Organization standards since 2007—although experts warn that serious secondary pollution continues to contaminate some city water before it reaches the tap.[88]

Nevertheless, we learned well the rules of daily life in China: drink only boiled or bottled water, no ice that can't be sourced to boiled or bottled water, no fruits or vegetables that haven't been cooked or peeled, and teeth are brushed with tap water at one's own risk. (Some of my friends did brush with tap water; others, including me, did not.) One must also remain vigilant that bottled water is truly factory-sealed, as scandals occasionally revealed empty bottles refilled with tap water being resold as new.[89] We were trained to look for an intact seal and then feel for the moment it breaks before taking a drink; if the cap came off too easily—well, better to be safe than sorry.

B. Our Renegotiated Relationship with Water

Without a doubt, adapting to life without potable water was the biggest cultural adjustment when my family first arrived in China. Nothing confirms the critical nature of this life-sustaining resource more than losing the taken-for-granted tap! The first consequence of our more cautious relationship to water was minor physical dehydration. When we were out, we could no longer rely on water fountains or public taps for refreshment, and even at home, we found ourselves less likely to drink when clean water was associated with so much more effort. With less easy access to water, we drank less—and we soon found ourselves more easily exhausted, ornery, and sick.

After we realized this, hydration became a more purposeful enterprise, and regular water consumption a project of conscious self-care. We knew the old adage that you can live for weeks without food, but only a few days without

TREATMENT MARKET IN CHINA 4 (2005), http://library.uoregon.edu/ec/e-asia/read/chinawater2005.pdf (noting that "traditional water treatment processes," such as screening, flocculation, sedimentation, filtration, and disinfection, are used in most Chinese water supply plants).

[88] Zhang Zihan, *Untapped Resource: Safe Drinking Tap Water Still Elusive in Beijing Despite New Standards*, GLOBAL TIMES (July 22, 2012), http://www.globaltimes.cn/content/722561.shtml (discussing Beijing water quality standards but noting that residents and experts still distrust it). *See also* Tao Tao & Kunlun Xin, *Public Health: A Sustainable Plan for China's Drinking Water*, NATURE (July 30, 2014), https://www.nature.com/news/public-health-a-sustainable-plan-for-china-s-drinking-water-1.15619 (arguing that until China is fully developed, it is more efficient to treat Chinese water pollution at the source than at the tap).

[89] Simon Elegant, *Now It's Fake Water*, TIME (Jul. 10, 2007), http://world.time.com/2007/07/10/now_its_fake_water/ (quoting reports that Chinese water bottling companies have illegally refilled used, unsterilized bottles of tap water and sold them as if they are new, sterile, and safe); *Now China Points Finger at "Fake" Water*, REUTERS (Jul. 9, 2007), http://www.reuters.com/article/2007/07/10/us-china-water-idUSPEK397820070710 (reporting that the practice of reselling tap water as "new" water has expanded to larger water cooler bottles).

water. So like most expats and well-to-do Chinese families, we arranged for bottled water service, enabling us to drink treated water from an office-style water dispenser rather than boiling it from the tap. The Fushan Mountain behind our neighborhood produced some freshwater springs, and many local families regularly journeyed there to collect clean mountain water in similarly large jugs. Every journey away from our apartment would involve water planning, as we took careful stock of how many were traveling, what would be needed, and how best to transport it. I always seemed to drink more than my Chinese friends, but I still seemed to be always thirsty.

The water issue also created other puzzling features of our new world. For example, we struggled to understand at exactly what point our dishes were clean enough to eat off after washing them in tap water. Were damp chopsticks safe to use? What about the recently-washed cup, still bearing that fine, wet sheen? And when dealing with my son's scraped knees and elbows, was it better to wash with soap and water to disinfect, or was the water itself a source of potential harm? In the end, we decided that cuts should be washed with soap and water until the dirt is out, but subsequently sterilized with disinfectant whenever possible. And while our Chinese friends would probably not take the same precautions, they had advised us that our intestines lacked the conditioned fortitude they had acquired, so we decided that dishes must be completely dry to be safe. I remained vigilant about water safety that entire year, feeling personally responsible for my young son's health. But when I let down my guard while visiting alone in 2016, I returned with an infection that may have been traceable to rural water in the southwest.

Water quality problems intersect with and exacerbate other environmental problems, too. For example, one unfortunate consequence of unreliable tap water is the resulting prevalence of disposables: single-use bottled water, disposable plates and bowls, even the single-use toothbrushes that are routinely provided by hotels at every economic level.[90] Ironically, I had spent the previous year spearheading a university sustainability initiative that sought personal pledges to avoid bottled water and other disposables as much as possible.[91] For this reason, it was particularly jarring for me to adjust to our new norm—where we were happier eating at a restaurant that provided disposable bowls, plates, and chopsticks, because we knew they wouldn't make us sick that evening.[92] By

[90] *Cf.* Jeffrey Hays, *Garbage and Recycling in China*, FACTS & DETAILS, http://factsanddetails.com/china/cat10/sub66/item1111.html (last updated Jan. 2014) (noting that "efforts by Chinese authorities to ban plastic packing material, disposable wooden chopsticks, plastic lunch trays and throwaway cosmetic items given out free at hotels have been mostly ignored").

[91] Suzanne Seurattan, *W&M Country's First DOT University*, WM. & MARY (Apr. 15, 2010), http://www.wm.edu/sites/sustainability/news/wm-countrys-first-dot-university.php (describing The College of William & Mary's "Do One Thing for Sustainability" initiative).

[92] I was happy to note that, at least at our favorite local restaurant, the plasticware was marked as biodegradable—but this was unusual.

contrast, at restaurants that provide the reusables I normally sought out at home, we were taught to sterilize them with hot tea before using them, because they had likely been rinsed in the too-thoroughly recycled dishwashing water that compounds the problems already coming out of the tap.

So, after religiously toting my reusable mug and stainless steel bottle to every American class the previous year, I now carried plastic bottles everywhere, purchasing new ones whenever replenishment was needed. I reused the small bottles as long as possible rather than discarding them after a single use, but they were usually filled with the water I got at home from the larger bottle dispenser in our kitchen. These dispensers were so common where we lived that there was a regular army of men on motor-scooters with an inordinate number of cooler-sized bottles strapped to the back, exchanging filled ones for empties at private homes and businesses. I'm happy to report that at least these large bottles are faithfully recycled. But I'm unhappy to observe that smaller plastic bottles litter the streets, parks, mountains, landfills, beaches, and accordingly, rivers and oceans.[93]

C. The Environmental Issue that Wasn't

Perhaps the most surprising aspect of our adjustment to the water situation in China was to learn that the potability problem, which seemed so daunting to us, was completely invisible to our friends and neighbors. As far as we could tell, the absence of potable water was simply a non-issue in China, and our hang-up about it struck our friends as just another entertaining curiosity of our foreignness.

Indeed, Chinese culture adapted long ago to the perils of non-potable water. Chinese people boil their water before drinking it, but that never seems like a burden—because they prefer drinking their water hot.[94] In fact, they range from amused to amazed when foreign visitors request cold water (which to them is as distasteful as drinking plain hot water is to those foreigners).[95] When guest lecturing around China, I often invited students to ask me questions of cultural exchange—anything they wanted to know about American culture, politics, or lifestyle—and the most frequent question I got was "Why do Americans like to drink [insert grimace here] *cold* water? Yuck!"

In February of 2012, I took a day hike with a friend in the coastal Laoshan Mountains, and we carried bottles of water in our packs. After climbing the

[93] *Cf.* Hays, *supra* note 90 ("In Beijing, taking out the trash in a *hutong* means taking whatever garbage you have—uneaten noodles, cabbage leaves, eggshells, paper—and dumping them on a designated street corner. Several time [sic] a day a rubbish collector shovels up the mess and carts it away.").

[94] *See e.g.*, Charlie Custer, *Why do Chinese People Drink Hot Water?*, WORLD CHINESE (Dec. 5, 2010), http://www.theworldofchinese.com/2010/12/why-do-chinese-people-drink-hot-water/.

[95] *Id.*

jagged hills, we were sweating inside our coats and ready to drink, but the bottles had become quite cold in the winter air. I eagerly put mine to mouth, but my friend held his for a long time before summoning the will to drink it. He noted that this was going to be the coldest water he had ever drunk, and it was clearly not an appetizing prospect. Finally, he drank it down with resignation, the way one drinks a cup of medicine. I couldn't help laughing out loud as I watched him, because it reminded me of my own reaction drinking recently boiled water on a hot summer day. But we had both adapted as needed; water is life's primary necessity, and you learn to do what you have to do to fulfill it. And then whatever that is becomes normal.

Perhaps as a result, there has been no groundswell of popular sentiment to "do something" about the non-potable water situation—certainly not in the same way that public concern has registered over the increasingly visible air pollution. From the perspective of most Chinese, there is no problem with the water, just because you have to boil it.[96] Why *wouldn't* you boil it? Who (but a crazy foreigner) would even want to drink cold water? And so, for the average Chinese water drinker, everything is as it should be. In 2011, when we asked our Chinese friends their feelings about non-potable water, it was not something they had spent a lot of time thinking about.

That said, the tide may be shifting as water pollution intensifies, which has happened for the same reasons air pollution has intensified—expanding industrial and industrial-agricultural development. In recent years, water pollution has evolved from a mostly ignored fact of life toward a grotesque tale of disaster-film proportions. Toxic discharges to waterways were already a concern for the local fishers and farmers who suffer the impacts directly,[97] but many urban Chinese had not experienced sludge, swirls, and fish kills in distant waterways as palpably as they do ambient air pollution. Yet urban alarm bells rang loud in 2013, when sixteen thousand dead pigs were found rotting in the Huangpu River in Zhejiang, a source of drinking water for the nearby city of Shanghai.[98]

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[96] *Cf.* Ed Flanagan, *China River's Dead Pig Toll Passes 13,000 but Officials Say Water Quality Is 'Normal'*, NBC NEWS (Mar. 16, 2013), http://behindthewall.nbcnews.com/_news/2013/03/18/17357810-china-rivers-dead-pig-toll-passes-13000-but-officials-say-water-quality-is-normal?lite.Francie%20Diep (discussing the discovery of thousands of pig carcasses in a river that supplies drinking water to Shanghai, and official reports that the water is still suitable for drinking); Francie Diep, *16,000 Dead Pigs in the Huangpu: Can You Still Drink Shanghai's Water?*, POPULAR SCI. (Mar. 25, 2013), http://www.popsci.com/science/article/2013-03/can-you-really-still-drink-water-shanghai (describing government assurances that the water is safe, and lingering public skepticism).

[97] Jane Qiu, *Chinese Survey Reveals Widespread Coastal Pollution*, NATURE (Nov. 6, 2012), http://www.nature.com/news/chinese-survey-reveals-widespread-coastal-pollution-1.11743.

[98] *See* Nicola Davison, *Rivers of Blood: The Dead Pigs Rotting in China's Water Supply*, GUARDIAN (Mar. 29, 2013), https://www.theguardian.com/world/2013/mar/29/dead-pigs-china-water-supply (discussing later reports tracing the dead pigs to black market dumping). *See also*

Reportedly, many of the pigs had been infected with porcine circovirus.[99] One party official conceded that farmers sometimes dump carcasses in the river for convenience, rather than using local processing plants—indicating that rotting carcasses in the water supply is, at least to some extent, a normal state of affairs.[100] However, the scale of this disaster far exceeded the norm, and investigators eventually traced the cause to illegal dumping by black marketeers.[101] The law requires that hogs killed by disease or natural causes be incinerated rather than butchered, but here, black market distributors had been butchering them for sale to the public until a recent enforcement crackdown.[102] This crackdown presumably inspired the black marketeers to dump their remaining stocks into the river, en masse.[103] Nevertheless, the government insisted that Shanghai's water remained safe for human consumption.[104] After all, large contaminants would be filtered out before the water entered municipal supply, and harmful bacteria would be killed when it was eventually boiled for cooking or drinking.

D. The Challenge of Environmental Enforcement

Chinese people will continue to boil their drinking water, but unfortunately, China is suffering from increasingly serious water pollution problems that can't just be boiled away.[105] Chemical pollutants entering the water supply from industry and agriculture are getting worse, involving toxins oblivious to disinfectants.[106] The World Health Organization has identified 2,221 different

sources cited *supra* note 96 (discussing the Huangpu River incident).

[99] *See* Davison, *supra* note 98.

[100] *Id.* (quoting Chen Yuanhua, party secretary for Zhulin).

[101] *Id.*

[102] *Id.* (reporting that life sentences given to butchers who had illegally sold meat from 77,000 carcasses had prompted black market traders to dump their remaining stock in the river).

[103] *Id.*

[104] *Id.*

[105] *See* SHAPIRO, *supra* note 58, at 8 (citing "a 2007 OECD study found that hundreds of millions of Chinese people drink water contaminated by arsenic, fluoride, untreated wastewater, fertilizers and pesticides and noting that "[s]evere water pollution affects 75 percent of China's rivers and lakes and 90 percent of urban groundwater, with 28 of China's rivers… so toxic that they are unsuitable even for agricultural use"). *See also* sources cited *supra* note 96.

[106] *Cf.* Nadya Ivanova, *Toxic Water: Across Much of China, Huge Harvests Irrigated with Industrial and Agricultural Runoff*, CIRCLE BLUE (Jan. 18, 2013), http://www.circleofblue.org/waternews/2013/world/toxic-water-across-much-of-china-huge-harvests-irrigated-with-industrial-and-agricultural-runoff/ (describing how agricultural fertilizers, pesticides, and livestock waste is regularly conveyed to drinking and marine water sources); *Agriculture a Major Source of Water Pollution in China*, WORLD NEWS NETWORK (Feb. 10, 2010), https://article.wn.com/view/2010/02/10/Agriculture_a_major_source_of_water_pollution_in_China/ (discussing a census of pollution sources targeting industrial, agricultural, and residential sources, as well as control facilities).

pollutants in waters worldwide,[107] and 765 of them in drinking water—but when we arrived in China, applicable drinking water standards tested for only 35 indicators.[108] These regulations, which had been in place since 1985, were replaced in 2012 by new criteria in the National Sanitary Standards for Drinking Water, which test for 106 different indicators (9 on a daily basis, and the rest on a weekly, monthly, or yearly basis).[109] Legal standards to control industrial point-source pollution have been improving steadily since then, but industrial pollution can still create acute public anxiety over the safety of local drinking water.[110] My OUC colleagues are optimistic that water conditions will improve with increasingly fortified legal standards—but until recently, these strongly worded regulations have not been faithfully enforced.[111]

Before I say more, it's important to pause and acknowledge the relationship between China's pollution problems, the urgency of its plans for economic development, and the mind-boggling progress it has made over a very short period of time. Just a few decades ago, China was still reeling from the political turmoil of the Cultural Revolution,[112] the chaos of the Great Leap Forward,[113] and the infamous famine times that followed.[114] Only after the Deng Xiaoping reforms of the late 1970s did national priorities shift toward full-speed-ahead economic development.[115] In the four decades since, the nation's progress in creating new industry and providing for basic human needs has been

[107] *Cf.* Carl M. Shy, *Chemical Contamination of Water Supplies*, 62 ENVTL. HEALTH PERSP. 399 (1985) (noting that 2,221 organic chemicals are found in water supplies worldwide, and 765 in drinking water).

[108] Email from Dr. Yu Ming, Researcher, Ocean University of China, to author (Jan 6, 2017, 7:00 PM) (on file with author).

[109] *Id.;* MINISTRY OF HEALTH OF CHINA, STANDARDS FOR DRINKING WATER QUALITY (2006) http://www.iwa-network.org/filemanager-uploads/WQ_Compendium/Database/Selected_guidelines/016.pdf.

[110] *See, e.g.*, Yao Lan, *Benzene Pollution Sparks Panic Buying of Bottled Water in Lanzhou*, ECNS (Apr. 11, 2014), http://www.ecns.cn/cns-wire/2014/04-11/109102.shtml (describing public panic after benzene levels twenty times the national safety standard were found in city tap water, presumably from local chemical plant pollution).

[111] *See generally* Ryan, *Elaborate Paper Tiger*, *supra* note 2 (discussing the failures of environmental law enforcement in China).

[112] *See generally* RICHARD CURT KRAUS, THE CULTURAL REVOLUTION: A VERY SHORT INTRODUCTION (2012) (discussing the political and societal chaos of the Cultural Revolution); DONGPING HAN, THE UNKNOWN CULTURAL REVOLUTION: LIFE AND CHANGE IN A CHINESE VILLAGE (2008) (discussing the Cultural Revolution in rural China).

[113] *See generally* RALPH A. THAXTON JR., CATASTROPHE AND CONTENTION IN RURAL CHINA: MAO'S GREAT LEAP FORWARD FAMINE AND THE ORIGINS OF RIGHTEOUS RESISTANCE IN DA FO VILLAGE (2008) (explaining how the failed policies of the Great Leap Forward drove rural Chinese to hunger, starvation, and efforts at resistance).

[114] *See id.*; sources cited *supra* note 25; Branigan, *supra* note 47.

[115] *See generally* JUNE M. GRASSO ET AL., MODERNIZATION AND REVOLUTION IN CHINA: FROM THE OPIUM WARS TO THE OLYMPICS (2008) (characterizing the reforms by Deng Xiaoping as China's second revolution on the journey toward modernization).

astonishing—especially in urban areas, and most markedly in coastal cities like Qingdao, Shanghai, and Shenzhen.[116] Yet even with 500 million Chinese now online,[117] some 200 million others—more than half the population of the United States—still live on about a dollar a day.[118]

When you're trying to feed 200 million mouths in the rural countryside, it can be hard to focus on maximum daily nitrogen loads and ground-level ozone.[119] (And let's not forget that even the United States, with a century's lead on industrial development, still struggles with water pollution problems, as demonstrated by the recent lead contamination crisis in Flint, Michigan.[120]) Yet economically marginalized people are especially vulnerable to the environmental harms associated with pollution and climate-related disasters.[121] Subsistence farmers and fishers are the first to experience the harms of environmental degradation to their health and livelihood. Understanding this, the government has increasingly recognized that ongoing development efforts must be better partnered with effective environmental regulation, evidenced by a raft of environmental laws and sustainability initiatives.[122]

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[116] *See, e.g.*, *Qingdao*, DEP'T COMMERCE SHANGDONG PROVINCE, http://en.shandongbusiness.gov.cn/city/65 (last visited Mar. 3, 2018) (discussing "the seven industrial bases" of development and industry within Qingdao, from household electronics to petrochemicals to machinery, textiles, and food).

[117] *See* Phelan, *supra* note 72.

[118] *See, e.g.*, Chun Han Wong, *More than 82 Million Chinese Live on Less than $1 a Day*, WALL STREET J. (Oct. 15, 2014), http://blogs.wsj.com/chinarealtime/2014/10/15/more-than-82-million-chinese-live-on-less-than-1-a-day/ (stating that 82 million rural Chinese live on less than a dollar and 15% of the total population [roughly 200 million] live on $1.25 a day or below); WORLD BANK GRP. & THE INT'L MONETARY FUND, GLOBAL MONITORING REPORT 2014/2015: ENDING POVERTY AND SHARING PROSPERITY 19 (2015), http://www.worldbank.org/content/dam/Worldbank/gmr/gmr2014/GMR_2014_Full_Report.pdf (discussing ongoing issues of rural poverty in China); *U.S. and World Population Clock*, U.S. CENSUS BUREAU, https://www.census.gov/popclock/ (last visited Nov. 20, 2016) (stating China's population at 1,373 million and the U.S. at 324 million, substantiating the above statistics).

[119] *Cf.* Wong, *supra* note 118.

[120] Merrit Kennedy, *Lead-Laced Water in Flint: A Step-by-Step Look at the Makings of a Crisis*, NAT'L PUB. RADIO (April 20, 2016), http://www.npr.org/sections/thetwo-way/2016/04/20/465545378/lead-laced-water-in-flint-a-step-by-step-look-at-the-makings-of-a-crisis (discussing the water crisis in Flint, Michigan).

[121] *See* Suzanne Goldenberg, *Climate Change: The Poor Will Suffer Most*, GUARDIAN (Mar. 30, 2014), https://www.theguardian.com/environment/2014/mar/31/climate-change-poor-suffer-most-un-report (reporting on a U.N. study indicating that the poor are most at risk from the harms of climate change and other natural disasters that will force food prices up, threaten marginal homes, and impact prospects for marginal employment).

[122] *See* Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 138–40. *See also* NAT'L DEV. & REFORM COMM'N, CHINA'S NATIONAL CLIMATE CHANGE PROGRAMME (2007), http://en.ndrc.gov.cn/newsrelease/200706/P020070604561191006823.pdf; Haibing Ma, *China Unleashes New Initiatives in Its Push to Secure a Sustainable Future*, WORLDWATCH INST. (Jan. 20, 2012), http://blogs.worldwatch.org/revolt/china-unleashes-new-initiatives-in-its-push-to-secure-a-sustainable-future (citing the Comprehensive Working Plan for Energy Conservation and Emission Reduction and the Working Plan to Control Greenhouse Gas Emissions).

Until recently, however, China's environmental laws have looked comprehensive on paper, but their goals have been undermined by chronic under-enforcement.[123] Illegal discharging has reportedly been very common, because there haven't been enough agency personnel to monitor them.[124] Even when violations have been discovered, they have not always been prosecuted (depending, perhaps, on the economic importance of the violators, or their political influence).[125] When the government failed to act in these circumstances, it has been hard for citizens to intervene, because Chinese courts have not historically recognized standing for public-interest citizen suits.[126] And even when traditional standing is established by a directly injured party, courts may or may not decide to hear the case (one of the more surprising features of the Chinese legal system, at least from a western perspective).[127] For these reasons and others, enforcement has long been identified as the major weakness in Chinese environmental law—a regime I have characterized in prior work as little more than an "elaborate paper tiger."[128]

In recognition of these failures and the serious consequences that have followed, the Chinese government has recently undertaken a monumental overhaul of environmental law, aiming for more stringent regulations and strengthened enforcement. In 2014, Premier Li Keqiang announced to the National People's Congress that China was declaring war against pollution, just as it had previously declared war against poverty.[129] The opening salvo was a set

[123] *See id*; *see also Law of the People's Republic of China on Prevention and Control of Water Pollution*, MINISTRY ENVTL. PROT., CHINA (May 11, 1984), http://english.mep.gov.cn/Policies_Regulations/laws/environmental_laws/200710/t20071009_109915.htm.

[124] Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 197 (noting that China's "Ministry of Environmental Protection, which oversees countless sources of pollution among a nation of 1.4 billion people, was staffed by as few as 200 employees in 2007," while the U.S. EPA "was staffed by 18,000 to oversee a nation of 300 million").

[125] *Id.* at 192 (discussing the challenges of patronage, corruption, and institutionalism that impair administrative review of environmental harms).

[126] *Id.* at 215 (discussing the hurdles for environmental plaintiffs in accessing judicial recourse).

[127] *Id.* at 217 (noting that Chinese judges often decline to hear environmental cases, sometimes under direction by Party representatives on judicial panels deciding whether cases may go forward). *See also* Xia Jun, *China's Courts Fail the Environment*, CHINADIALOGUE (Jan. 16, 2012), https://www.chinadialogue.net/article/show/single/en/4727--China-s-courts-fail-the-environment- (discussing the difficulties for environmental plaintiffs when defendant industries have ties to local officials that can hire, fire, and set salaries for judicial staff).

Of note, without reliable access to judicial review, Chinese citizens developed an alternative tradition for seeking state intervention on their behalf, by standing outside the agency seeking personal attention. *See, e.g.*, SHAPIRO, *supra* note 58, at 128 ("Traditionally, wronged citizens seek to bring a petition to a higher authority by traveling to the front gate of an agency and trying to pass a letter to an influential person inside, or to display a large poster on the sidewalk outside detailing their woes or to use personal influence or bribery to try and gain redress.").

[128] Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 190–213 (listing literature highlighting enforcement issues in Chinese environmental law).

[129] Michael Greenstone, *Four Years After Declaring War on Pollution, China Is Winning*, N.Y. TIMES (Mar. 12, 2018), https://www.nytimes.com/2018/03/12/upshot/china-pollution-environment-

of landmark amendments to the basic Environmental Protection Law, which entered into force in early 2015.[130] The new amendments exhort the adoption of more environmentally friendly practices, and they impose stiffer penalties for environmental wrongdoers, ranging from public shaming to criminal punishment.[131] They also allow limited public interest suits by citizens and certain environmental NGOs,[132] capitalizing on a tool of environmental enforcement that has been fruitful in the United States.[133] China's experimentation with specialty environmental courts may also help redress these important problems.[134]

Harsher penalties and expanded legal access show that the government is taking environmental harm more seriously, but of course, new legal threats will prove familiarly empty if violations are not consistently prosecuted.[135] However, in a noteworthy effort to improve on past enforcement failures, the new amendments also provide for the firing or demotion of local officials found to have covered up or participated in environmental wrongdoing by falsifying data, illegally withholding environmental data from the public, or failing to enforce legally required closure of violating industry.[136] Adding to the stakes for local officials charged with environmental enforcement, those responsible for environmental impact assessments may be held jointly liable for resulting environmental harm if they are found to have performed their assessment duties fraudulently.[137] In these ways, the new law has been redesigned not only to deter polluters, but also to deter complicit regulators from undermining environmental laws by allowing violations to continue unpunished.[138]

When I first arrived in China in 2011, the enormous gap between the soaring

longer-lives.html (observing genuine environmental progress since China declared war on pollution).

130 *China's Legislature Adopts Revised Environmental Protection Law*, NAT'L PEOPLE'S CONGRESS, CHINA (Apr. 25, 2014), http://www.npc.gov.cn/englishnpc/news/Legislation/2014-04/25/content_1861275.htm.

131 *Id.*

132 *Id.*

133 *See, e.g.*, 33 U.S.C. § 1365 (detailing the Clean Water Act citizen suit provision).

134 In 2016, a report for the United Nations Environment Programme placed the number of environmental courts in China at 456. GEORGE PRING & CATHERINE PRING, ENVIRONMENTAL COURTS AND TRIBUNALS: A GUIDE FOR POLICY MAKERS 83 (2016), https://wedocs.unep.org/bitstream/handle/20.500.11822/10001/environmental-courts-tribunals.pdf; *see also* Alex L. Wang & Jie Gao, *Environmental Courts and the Development of Environmental Public Interest Litigation in China*, 3 J. CT. INNOVATION 37, 37–38 (2010), https://law.pace.edu/sites/default/files/IJIEA/Wang_Gao_FINAL1.JB-2-15doc_cropped.pdf (reporting on specialized courts and environmental public interest lawsuits).

135 Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 138–40.

136 *China's Legislature Adopts Revised Environmental Protection Law*, *supra* note 129. *See also* EUROPEAN UNION-CHINA ENVTL. GOVERNANCE PROGRAMME, ENVIRONMENTAL PROTECTION LAW OF THE PEOPLE'S REPUBLIC OF CHINA (2014), https://www.chinadialogue.net/Environmental-Protection-Law-2014-eversion.pdf.

137 *Id.*

138 Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 138–40.

legal directives of China's environmental laws and the toothless nature of their implementation left my Chinese colleagues deeply discouraged. What good are beautifully written laws if, like a paper tiger without teeth, they are never actually enforced? Yet the Environmental Protection Law amendments of 2015 suggested a new future for meaningful environmental regulation, and potentially a great accomplishment in governance. The amendments acknowledge that under-enforcement had been the Achilles heel of Chinese environmental law to that point, and they create real impetus for change. As I have noted elsewhere, if these new enforcement incentives are themselves enforced "(the big 'if')," then they have the potential to put real bite into the Paper Tiger.[139]

E. Emerging Legal Reforms

We will all have to keep holding our breath (and boiling the water) to see what happens in the wake of these changes, but emerging legal reforms provide real reasons for hope. During my return visit in 2016, my colleagues and I had the privilege of meeting with officials from the Ministry of the Environment, environmental advisors to the State Council, provincial level environmental administrators, and public interest NGOs. Everyone was eager to talk about the new direction of Chinese environmental governance, how the amended Environmental Protection Law was working, and other changes that were needed. Ministry officials were working on updates to the Law to Prevent and Control Water Pollution, improved waste management policies, and other important regulations to protect the public and the environment. In the years that have followed, these efforts have produced encouraging measures designed to improve regulatory accountability, empower public engagement, and better couple aspirational rules with enforceable mandates.

For example, the Water Pollution Prevention and Control Law was revised in 2017,[140] yielding stricter regulations that went into effect on January 1, 2018.[141] The amendments mandate various measures to improve water quality and impose fines and suspensions for water suppliers who fail legal standards.[142] The new law requires quarterly public reports about water quality, mandates emergency and back-up water resources in vulnerable areas, sets standards for fertilizer and pesticide use, and prohibits sewage outlets in drinking water source

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[139] *Id.*

[140] *Water Pollution Prevention and Control Law of the People's Republic of China (2017 Revision)*, CHINA LAW INFO (June 27, 2017), http://en.pkulaw.cn/display.aspx?cgid=297378&lib=law (providing advance copy of the newly amended Water Pollution Law, which officially went into effect on January 1, 2018).

[141] Meng Jie, *China Revises Law on Water Pollution Prevention and Control*, XINHUA (June 27, 2017), http://www.xinhuanet.com/english/2017-06/27/c_136399271.htm.

[142] *Water Pollution Prevention and Control Law of the People's Republic of China (2017 Revision)*, *supra* note 140; *Id*.

areas.[143] Notably, it also establishes a new system of water resource management that makes high-ranking government officials personally responsible for the maintenance of healthy watersheds.[144] Under the "River Chief" system, leading government officials are charged with direct responsibility for maintaining the health of a given watershed, including protection of the resource, waterline management, pollution prevention, and even ecological restoration.[145] Especially important, the amended law incentives meaningful enforcement by forthrightly attaching government officials' career advancement to statutory objectives. Those who achieve statutory goals will be rewarded with promotions, while those who fail them will be punished by fines and lost career opportunities.[146]

The revised Water Pollution Law represents one front in China's "war on pollution,"[147] but others have emerged simultaneously. In an unprecedented crackdown on pollution, the Ministry of Environmental Protection shuttered tens of thousands of factories in 2017, and it reprimanded, fined, or prosecuted officials with criminal offenses over environmental practices at more than 80,000 others.[148] The Ministry also banned the importation of waste that exacerbates soil and water pollution,[149] and a draft law working its way through the legislature would fine polluters hundreds of thousands of dollars for dumping untreated contaminants into the soil.[150] As discussed further in Part V, China continues to pursue the creation of carbon markets to limit greenhouse gas production,[151] and the government recently suspended production of five

[143] Meng Jie, *supra* note 141.

[144] *Water Pollution Prevention and Control Law of the People's Republic of China (2017 Revision)*, *supra* note 140, at Article 5 (establishing the "river chief" system).

[145] *Id.*; Meng Jie, *supra* note 141 (describing the river chief's responsibilities).

[146] Meng Jie, *supra* note 141 (describing how the law will reward officials' compliance, or punish lack thereof).

[147] *See* Greenstone, *supra* note 129; Meng Jie, *supra* note 141 (characterizing the new Water Pollution Law amendments as part of the overall Chinese war on pollution).

[148] Rob Schmitz, *China Shuts Down Tens of Thousands of Factories in Unprecedented Pollution Crackdown*, NAT'L PUB. RADIO (Oct. 23, 2017), https://www.npr.org/sections/parallels/2017/10/23/559009961/china-shuts-down-tens-of-thousands-of-factories-in-unprecedented-pollution-crack.

[149] Christine Cole, *China Bans Foreign Waste—But What Will Happen to the World's Recycling?*, SCI. AM. (Oct. 21, 2017), https://www.scientificamerican.com/article/china-bans-foreign-waste-but-what-will-happen-to-the-worlds-recycling/ (reporting that China has banned imports of 24 categories of recyclables and solid waste, including plastic, textiles, and mixed paper).

[150] *China to Hit Polluters Harder in New Soil Protection Law*, REUTERS (June 22, 2017) https://www.reuters.com/article/us-china-pollution-soil/china-to-hit-polluters-harder-in-new-soil-protection-law-idUSKBN19E00N (reporting that the new law would fine polluters as much as two million yuan, or just shy of $300,000).

[151] *China Sets Out Scaled-Back Vision for Biggest Carbon Market*, BLOOMBERG NEWS (Dec. 19, 2017), https://www.bloomberg.com/news/articles/2017-12-19/china-unveils-plan-for-world-s-biggest-carbon-trading-market (reporting on a plan for carbon emissions trading that will cover 1,700 utilities, down from the 6,000 companies it had initially considered).

hundred different models of cars that did not meet national fuel economy standards.[152] In addition, China recently enacted plans to cover one quarter of its total landmass with new forest by the end of the decade, in order to sequester carbon, filter water pollution, stabilize soils, control temperature, and provide other ecological benefits.[153] The goal is to create some 6.66 million hectares of new forest, comparable in size to the nation of Ireland.[154]

In 2016, I left China with renewed, if qualified, optimism about the future of Chinese environmental law. My optimism came from the ferocity of effort with which the government is attempting to shift gears, and from the clarity of the commitment I saw in the individuals charged with meeting these new goals. It will not be easy to change course, but these legal reforms show that China is providing critical tools for central, provincial, and local administrators to rise to their task. Many honorable people are putting their professional careers on the line to try and improve the status quo[155] (and some particularly humbling individuals have staked even more than that[156]).

The qualification came from the fact that it will still, in the end, come down to the individual will of those making decisions in each instance. In 2016, the environmental policymaking elite were moving mountains to change legal norms—but some decision-makers in China have yet to come on board. The old, carefully cultivated government habit of prioritizing economic development over environmental protection dies hard. Environmental NGO leaders told us harrowing tales of nearly failed efforts to use the new citizen suit provision of the Environmental Protection Law, having been shut out in the courts all the way to the Supreme Court of China. The Supreme People's Court ultimately came to their rescue, upholding expanded public interest standing to allow many more NGOs to bring environmental claims.[157] This is a positive sign, but as in

[152] Hiroko Tabuchi, *China, Moving to Cut Emissions, Halts Production of 500 Car Models*, N.Y. TIMES (Jan. 2, 2018), https://www.nytimes.com/2018/01/02/climate/china-cars-pollution.html?rref=collection%2Ftimestopic%2FChina%20and%20the%20Environment%20 (noting the China Vehicle Technology Service Center's admonition that suspensions will affect both domestic carmakers and foreign joint ventures).

[153] *China to Create New Forests Covering Area Size of Ireland: China Daily*, REUTERS (Jan. 4, 2018), https://www.reuters.com/article/us-china-environment-forest/china-to-create-new-forests-covering-area-size-of-ireland-china-daily-idUSKBN1EU02L.

[154] *Id.*

[155] *Cf.* Xia Jun, *China's Courts Fail the Environment,* CHINA DIALOGUE (Jan. 16, 2012), https://www.chinadialogue.net/article/show/single/en/4727--China-s-courts-fail-the-environment (discussing the professional hardships faced by environmental lawyers in China).

[156] *Cf.* Andrew Jacobs & Chris Buckley, *China Targeting Rights Lawyers in a Crackdown*, N.Y. TIMES (July 22, 2015), https://www.nytimes.com/2015/07/23/world/asia/china-crackdown-human-rights-lawyers.html (discussing the government's detention of hundreds of human rights lawyers in a crack-down that "lawyers call the most withering political assault on their profession in decades"). Environmental lawyers are not as targeted as human rights lawyers in China, but many remain cautious.

[157] *See* Michael W. Vella, *China Begins Enforcing Newly Amended Environmental Protection*

the United States, justice is largely determined by the decisions of lower courts and government officials. How many cases ever make it all the way to the Supreme Court? Similarly, environmental administrators discussed innovative approaches to environmental enforcement taken in one or two provinces, but at least at that time, noted that these efforts were unusual.

Perhaps the most memorable exchange occurred when Professor Wang Canfa, a renowned Chinese environmental law professor and pioneer,[158] shared a graph of enforcement actions brought in the first two years after passage of the 2014 amendments to the Environmental Protection Law. In the 32 administrative-level provinces for which data was provided, about a quarter had 100 or more enforcement actions requiring the shut-down of violating facilities, half had fewer than 50, and a few had no enforcement actions at all.[159] But two provinces had reported more than 300 of these enforcement actions—Hunan with 396, and Zhejiang with 594.[160] Professor Wang explained that there were no more actual violations in Zhejiang than in any of the others; the difference was simply that Zhejiang officials had decided to use the tools of the new Environmental Protection Law to do something about them.[161]

Professor Wang's data demonstrates two equally important things. First, it reveals just how powerful the new Environmental Protection Law can be, indicating the unprecedented degree of enforcement it enables. Second, it highlights how much the ultimate success of the law will depend on what local government officials decide to do with it. His example shows how much a province can do, if only it chooses to use its power under the law. At that early point in the story, only one province was making that choice, but we all left hopeful that others would follow.

Apparently, the National People's Congress harbored the same hope, as evidenced by a set of procedural reforms the following year, designed to engage exactly these local officials on the green team. Facilitating local enforcement, it

Law, JONES DAY (Jan. 2016), http://www.jonesday.com/china-begins-enforcing-newly-amended-environmental-protection-law-01-21-2016/ (reporting that on January 6, 2015, the Supreme People's Court clarified that some 700 private NGOs would now be eligible to bring public interest environmental civil litigation).

158 Wang Canfa, perhaps the most famous environmental lawyer in China, is a professor at the China University of Political Science and Law and Director of the only academic environmental law clinic in China, The Center for Legal Assistance to Pollution Victims. *See* Austin Ramzy, *Heroes of the Environment: Wang Canfa*, TIME (Oct. 17, 2007), http://content.time.com/time/specials/2007/article/0,28804,1663317_1663320_1669921,00.html.

159 Wang Canfa, *The Achievements and Challenges of the Implementation of the New Environmental Protection Law*, *in* PATHWAYS TO A CLEAN ENVIRONMENT: LAW, ENFORCEMENT, AND THE PUBLIC IN CHINA AND THE U.S (June 15, 2016) (Professor Wang indicates that the data represents Jan.-Dec., 2015, except that Shandong data is missing between Feb.-June, and that it was collected from "the environmental protection departments from different administrative levels") (powerpoint on file with author).

160 *Id.*

161 *Id.*

amended the Civil Procedure and Administrative Procedure Laws to authorize local prosecutors to bring civil public interest environmental litigation, which should greatly enhance the likelihood that environmental harms will receive judicial redress.[162] The Civil Procedure Law now enables the procuratorate (local officials who prosecute and investigate wrongdoing) to file lawsuits "against acts that compromise public rights and interests in cases related to environmental and natural resources protection and food and drug safety."[163] The amended Administrative Procedure Law enables them to bring administrative lawsuits for "abuse of power or nonfeasance in cases concerning environmental and natural resources protection, food and drug safety, preservation of state assets, and transfer of state-owned land use rights."[164] In pilot provinces granted early access to this authority, public interest environmental cases brought by the procuratorate enjoyed overwhelming success in court.[165]

While these procedural reforms may seem bland in comparison to banning five hundred polluting car models or planting an Ireland-sized forest, they may ultimately yield more substantial environmental benefits by engaging local government where environmental harm is most acute. As noted above, environmental citizen suits were not even possible until experimental reforms enabled limited public interest standing for selected environmental organizations.[166] But procuratorates are state actors with many more financial and political resources than non-profit NGOs, and expanding this authority to them, nationwide, could energize environmental enforcement beyond all past measures.

Beginning in 2018, China will also assess a new environmental business tax against the producers of water, air, noise, and solid waste pollution that could generate over $7 billion—and the plan is to allocate tax revenue to local governments, specifically "to motivate participation in the fight against pollution."[167] Newly emerging reforms will also authorize provincial

[162] Laney Zhang, *China: Laws Amended to Allow Prosecutors to Bring Public Interest Lawsuits*, LIBR. CONGRESS (July 6, 2017), http://www.loc.gov/law/foreign-news/article/china-laws-amended-to-allow-prosecutors-to-bring-public-interest-lawsuits/ (discussing "Decision of the NPC Standing Committee on Amending the PRC Civil Procedure Law and the PRC Administrative Procedure Law," June 27, 2017, made effective July 1, 2017, according to the official National Party Congress website).

[163] *Id.* (discussing new Article 55(2) of the Civil Procedure Law).

[164] *Id.* (discussing new Article 25(4) of the Administrative Procedure Law).

[165] *Id.* (discussing a two-year pilot program in which 13 provincial procuratorates handled 7,886 public interest cases and filed 934 lawsuits, and that "[a]mong the 222 cases brought by the procuratorates that actually went before a court, in all of them the courts ruled in favor of the procuratorates").

[166] *See supra* notes 129–132 (discussing public interest standing); *see also* Zhang, *supra* note 162; Vella, *supra* note 157.

[167] *China Starts Collecting Environmental Tax*, XINHUANET (Jan. 1, 2018),

governments to file lawsuits for compensation against polluters for ecological damage, if those polluters cannot reverse the damage themselves.[168] Allowing local governments to seek financial redress for environmental harm and even tax it will provide new incentivizes for local enforcement, potentially bringing even the most recalcitrant old-school officials on board with the new environmental agenda. Accordingly, if I left China in 2016 with qualified optimism, 2017 provided cause for even more optimism and even fewer qualifications.

F. Water Scarcity and Engineering

Water quality is tightly bound up with water quantity,[169] and so China's unique experience of water scarcity warrants mention here as well. Quality and quantity are related for many reasons, but the principal one is obvious: the more water there is, the easier it is to ensure that it will be of high quality, because contaminants are more broadly diluted. In the United States, older water allocation laws dealing with the quantity available for human use evolved separately from newer environmental laws that govern water quality, creating legal and practical management hurdles that continue to hamstring American water policy.[170] Chinese water managers, however, do not suffer from the same handicap. Going forward, this is a realm of environmental regulation in which China may be better positioned than the United States to rationally integrate the two concerns. Indeed, China has only recently begun tackling issues of water quality, but perhaps it can draw on the expertise it has developed managing acute problems of water quantity over several thousand years.

In a nation already comfortable with boiling its drinking water, the more immediate concern has always been to ensure that there is water enough even for boiling. It's a serious concern, because China has one of the lowest per capita rates of fresh water in the world.[171] Northern China is arid and especially

http://www.xinhuanet.com/english/2018-01/01/c_136865174.htm ("The central government will allot revenue from the environmental protection tax to local governments to motivate participation in the fight against pollution."); *China to Let Local Government Keep Environmental Tax Revenues*, REUTERS (Dec. 27, 2017), https://www.reuters.com/article/us-china-environment-tax/china-to-let-local-government-keep-environment-tax-revenues-idUSKBN1EL0UN.

168 *China to Expand Pilot Reform in Ecological Damage Compensation*, ST. COUNCIL, CHINA (Dec. 17, 2017), http://english.gov.cn/policies/latest_releases/2017/12/17/content_281475980133814.htm (announcing a decision by the Communist Party of China Central Committee and State Council to establish a comprehensive damage compensation system for ecological harm, by which individuals or companies that cause environmental damage will be required to restore the environment or pay for the losses).

169 *See generally* Joseph L. Sax, *The Limits of Private Rights in Public Waters*, 19 ENVTL. L. 473 (1989).

170 *Id.*

171 *See, e.g.*, SHAPIRO, *supra* note 58, at 47 (noting that China's per capita water resources are among the lowest in the world, at just one-fourth of the world average); Yue Jia, *Per Capita Water Supply Beijing Drops to One-tenth the International Standard*, CHINA GREEN NEWS (May 18, 2011),

lacking sufficient water, marked by some of the world's great deserts, like the Gobi of the Mongolian Plateau and the Taklimakan in western Xinjiang.[172] Even wealthier regions that have overcome the worst of China's waterborne disease problems suffer from serious water scarcity. As noted, Beijing's water treatment satisfies WHO standards,[173] but it lies at the foot of the Mongolian Plateau in the arid North, where water scarcity is comparable to parts of the Middle East.[174] Even coastal Qingdao faces serious water scarcity, notwithstanding the freshwater springs that pepper the Laoshan Mountains.[175] In 2013, a new desalination plant was commissioned there to serve 500,000 residents and forestall supply shortages.[176]

Yet as a nation, China is nothing if not resourceful, and its history of environmental engineering to make efficient use of scarce water resources is nothing short of astonishing. The lack of water resources poses a serious threat for these more arid parts of China,[177] but it rains plentifully in the south and along much of the coasts.[178] The significance of this bifurcation has not been lost on the Chinese government, which is in the process of erecting the most massive water-delivery infrastructure in world history.[179]

The South-North Water Transfer Project, a project underway for fifty years now and scheduled for completion in another forty, will shift enormous

http://eng.greensos.cn/ShowArticle.aspx?articleId=964 (reporting that Beijing's per capita water resources, at 100 cubic meters, falls far short of the internationally recognized water shortage threshold of 1000 cubic meters per person); SHAPIRO, *supra* note 58, at 8 (noting World Bank estimates that over 300 million rural Chinese lack access to safe drinking water resources).

172 SHAPIRO, *supra* note 58, at 9 (stating that the North has 16% of China's water but 60% of its cropland).

173 Zhang, *supra* note 88 (noting that Beijing water is supposed to meet WHO standards).

174 Luna Lin, *Beijing Water Shortage Worse than the Middle East*, CHINADIALOGUE (Aug. 29, 2013), https://www.chinadialogue.net/blog/6319-Beijing-water-shortage-worse-than-the-Middle-East/en (noting that Beijing's per capita water availability falls well below the U.N. "absolute water scarcity threshold").

175 *China: Water—Energy Nexus in the Urban Water Source Selection in Qingdao City (#462)*, GLOBAL WATER PARTNERSHIP, https://www.gwp.org/en/learn/KNOWLEDGE_RESOURCES/Case_Studies/Asia/China-Water---Energy-Nexus-in-the-Urban-Water-Source-Selection-in-Qingdao-City-462/(last updated Mar. 2, 2015) (describing chronic water shortages in the city).

176 *Qingdao Desalination Plant, Shadong Province*, WATER TECH., http://www.water-technology.net/projects/qingdao-desalination-plant-shadong-china/ (last visited Nov. 21, 2016); *Abengoa Commences Operations at Qingdao Desalination Plant in China*, WATER TECH. (Jan. 31, 2013), https://www.water-technology.net/uncategorised/newsabengoa-qingdao-desalination-plant-china/.

177 *See* Scott Moore, *China's Massive Water Problem*, N.Y. TIMES (Mar. 28, 2013), http://www.nytimes.com/2013/03/29/opinion/global/chinas-massive-water-problem.html?_r=0 (discussing northern China's water scarcity).

178 SHAPIRO, *supra* note 58, at 9 (noting geographical asymmetries, with eight percent of total water falling in the South).

179 Rob Schmitz, *A Warning for Parched China: A City Runs Out of Water*, MARKETPLACE (Apr. 25, 2016), https://www.marketplace.org/2016/04/21/world/warning-parched-china-city-runs-out-water.

quantities of water from southern China to the arid north.[180] Linking China's four main rivers together in a network of diversions, it will eventually move almost 50 billion cubic meters of water annually.[181] Although the project has already caused staggering human displacement and environmental consequences,[182] most of the Chinese I have spoken to—even those from regions in which water is taken—seem to accept the need for extreme inter-basin transfers to support northern population centers like Beijing. As they describe it, these are the necessary sacrifices that one makes for the overall team, the nation of which they are a part. And they are proud of the ingenuity and engineering that underwrites this aspect of "Man-Made China."[183]

Like nearly everything else in China, its history of mind-boggling human interventions with water began thousands of years ago. I had the opportunity to explore a classic example while visiting the Turpan Depression near the city of Urumqi in Xinjiang Province. Turpan is the lowest and hottest place in China, at 150 meters below sea level and in the middle of China's most arid desert.[184] And yet there in the desert was a blooming oasis of vineyards, agriculture, and a Uighur community. How was it possible? Apparently, it is because some two thousand years earlier, the ancestors of the people who still live there today dug 5,272 kilometers of underground canals with 172,367 vertical well shafts, all designed to collect and redistribute the groundwater accumulating from snowmelt on the nearby mountains.[185] At its height, we were told, the "Turpan

[180] *South-to-North Water Diversion Project*, WATER TECH., http://www.water-technology.net/projects/south_north/ (last visited Mar. 19, 2018) (describing the overall project); SHAPIRO, *supra* note 58, at 8 (describing the "*nanshui beidiao*" as a three-channel project to move water from the Yangzi to the Yellow River); *Id.* (describing regional conflicts between water supply and demand).

[181] SHAPIRO, *supra* note 58, at 8 (noting the "enormous environmental and social implications" of the project, including effects on irrigated agriculture in the south, human rights implications for the forcibly relocated, and the potential for devastating ecological impacts, especially on the Tibetan Plateau).

[182] SHAPIRO, *supra* note 58, at 48 (noting that the project caused the forcible relocation of some 300,000 people).

[183] *See infra* Part VIII(D), "Man-Made China" (discussing national pride in large-scale environmental engineering projects like these).

[184] *See, e.g.*, David K. Lynch, *Land Below Sea Level*, GEOLOGY, http://geology.com/below-sea-level/ (last visited Nov. 21, 2016) (reporting that Turpan Depression is 154 meters below sea level).

[185] Shalamu Abudu et al., *The Karez System in China's Xinjiang Region*, MIDDLE EAST INST. (Jan. 17, 2014), http://www.mei.edu/content/karez-system-china%E2%80%99s-xinjiang-region; Roger D. Hansen, *Karez (Qanats) of Turpan, China,* WATERHISTORY.ORG, http://www.waterhistory.org/histories/turpan/ (last visited Nov. 21, 2016); Eva Rammeloo, *An Ancient Oasis in China's Remote Desert*, BBC (Mar. 15, 2017), http://www.bbc.com/travel /story/20170307-an-ancient-oasis-in-chinas-remote-desert ("At its peak in 1784, the karez spanned 5,272 km, with 1,237 km running through the basin. The water flowed directly to the farms and vineyards, while residents drew cool, crisp drinking water from one of 172,367 wells."); Andrew Jacobs, *In a Parched Corner of Xinjiang, Ancient Water Tunnels Are Running Dry*, N.Y. TIMES (Sept. 21, 2016), http://www.nytimes.com/2016/09/22/world/asia/china-xinjiang-turpan-water.html (discussing the decline of the water resources there).

Karez" channeled 858 million cubic meters of water into 1,784 lines to distribute it to all parts of the region.[186] (It's hard to even imagine what this looks like; best to see it in photographs if not in person.[187]) It is a staggering feat of civilization—a celebration of creativity, environmentally sustainable terrascaping, and the human will to thrive against all odds.[188]

Modern-day Urumqi, the capital of Xinjiang, relies on similarly creative water technology. During my visit, I saw acres of recently planted, spindly young trees in the desert outskirts of the city, lined up like toothpicks piercing the mostly barren earth. I would often ask my hosts, "How will these trees take root? With what water?", and I was always told, "Oh, there is enough water here." I knew that the trees had been planted for environmentally sound reasons—to help stabilize the soil, moderate ground temperature, and trap airborne dust—but I still couldn't understand how they would survive in such arid ground, only occasionally studded with sagebrush scrub. In my broken Chinese, I would persist, "But if there were really enough water to grow trees, wouldn't there already be trees here?" And they would quietly insist, "No, no—there will be enough water," though I could never understand from them why.

Then on my last day, I visited a popular public park in the middle of the city, where the temperature was ten degrees cooler thanks to the canopy of the many mature trees that ringed its central hill and the banks of the creek flowing around it. I followed the creek and my curiosity to the crown of the hill, where I was astonished to find a complex terrascaping system for just this park. There was a small, pool-shaped reservoir at the top, supplied by a large pipe snaking up the hill (it wasn't clear to me from where), and a network of canals extending radially outward down the hill in all directions. Indeed, the park's oasis was created in the same manner as the Turpan Karez: decades earlier, the now lush trees had been planted in rings around the hill, and the reservoir fed them a steady supply of water through the canals at their base. I was awed by the success of the project, and the clear joy it gave the city residents who collected

[186] Today, that volume is declining as water resources grow more scarce. Jacobs, *supra* note 185; Eset Sulaiman, *Exploitation Puts Ancient Well System at Risk in Uyghur Region*, RADIO FREE ASIA (Apr. 27, 2017), https://www.rfa.org/english/news/uyghur/wells-04272017165849.html (reporting an annual volume of 300,000 cubic meters).

[187] *See, e.g.*, George Steinmetz, *Karez Water System in the Turpan Depression in China*, GETTY IMAGES, http://www.gettyimages.com/detail/photo/karez-water-system-in-the-turpan-depression-high-res-stock-photography/539063970 (last visited Jan. 3, 2017) (aerial photo); Wolfgang Kaehler, *Three Karez Water System Pictures and Images*, GETTY IMAGES (Jan. 1, 2001), http://www.gettyimages.com/photos/karez-water-system?excludenudity=true&family=editorial&page=1&phrase=Karez%20Water%20System&sort=best#license (showing interior water system pictures).

[188] *But see* Andrew Jacobs, *In a Parched Corner of Xinjiang, Ancient Water Tunnels Are Running Dry*, N.Y. TIMES (Sept. 21, 2016), http://www.nytimes.com/2016/09/22/world/asia/china-xinjiang-turpan-water.html (noting the "immediate threat" of soaring demand by petroleum drillers and industrial-scale farmers who are "sucking the Turpan Basin dry").

there to enjoy its peace and beauty. And I suddenly suspected what mechanisms might be helping those new trees take root in the desert surrounding the city.

With such scarcity at hand, China is trying to avoid squandering its water resources with regulatory efforts that target both quantity and quality.[189] Wherever there are flush-toilets, they are almost always dual-flush water-saving toilets, with separate levers for the two types of waste they will encounter (one of which needs more water than the other). Solar-powered water heaters effectively reduce consumption by limiting hot water to what can be stored on the roof at any given time (although the more expensive models, like the one in our apartment, have a gas or electric backup).[190] Greater efforts are being made to reduce, reuse, and recycle water wherever possible.[191] Hopefully, China will find a way to enact and enforce more effective water pollution laws to avoid further industrial and agricultural degradation of the resource.

Nevertheless, I'm told there are no great plans on the horizon to achieve drinkable tap water, because once again, potability is not a cultural priority in China.[192] The mantra will continue: boiled or bottled, cooked or peeled, rinse at your own risk. Hopefully, strengthened environmental laws will mitigate further industrial pollution. And if all goes well with the South-North Water Project, there will at least be water to boil.

V. BREATHING AIR WITH HEFT

About halfway through my year in China, I was invited to guest lecture at a university in Japan. It was an environmental lecture that I had given frequently in China, and during my flight, I carefully considered the different reactions I might expect from a Japanese audience. But as it turned out, the most unexpected environmental insight was my own, on arrival. My reaction—one that literally knocked me off my feet the moment I first stepped outside—was to the air. The clean, fresh, sweet-smelling, healthy-feeling air. After months of breathing in China, the air was so beautiful that I spontaneously danced. There

[189] *See, e.g.*, Renee Cho, *How China Is Dealing With Its Water Crisis*, EARTH INST., COLUM. U. (May 5, 2011), http://blogs.ei.columbia.edu/2011/05/05/how-china-is-dealing-with-its-water-crisis/ (discussing official efforts to increase supply and curb demand, including a commitment of $612.23 billion toward conservation efforts).

[190] *See, e.g.*, Bill McKibben, *Can China Go Green?*, NAT'L GEOGRAPHIC MAG. (June 2011), http://ngm.nationalgeographic.com/print/2011/06/green-china/mckibben-text (describing rooftop solar-thermal systems); *infra* notes 270, 525 and accompanying text (discussing solar water heaters in China).

[191] *See, e.g.*, Wang Hongchen, *Sustainable Water in China*, CHINA GREEN NEWS, http://eng.greensos.cn/ShowArticle.aspx?articleId=605 (last visited Nov. 21, 2016) (discussing the importance of water recycling, especially in sewage treatment).

[192] *But see* URBAN LAND INST., INFRASTRUCTURE 2013: GLOBAL PRIORITIES, GLOBAL INSIGHTS 23 (2013), http://www.uli.org/wp-content/uploads/ULI-Documents/Infrastructure-2013.pdf (noting growing political pressure to address water potability).

was no haze, no taste, no grit. You could see the world crisply and clearly ahead of you for miles—even better than I could recall from home in the United States. I realized in that moment how much I had forgotten what this could be like, or forced myself to forget, just to get on with daily life. But like an elephant, the lungs never forget, and at that moment, my lungs were singing with joy.

Which makes this a good moment to confront the great elephant in the room of Chinese environmental issues. . . and talk about the experience of living with China's notorious air quality problems.

A. The Elephant in the Room

Everyone knows that air pollution is a serious problem in China.[193] Unlike water pollution that can be less obvious in urban areas, plumes of visible air pollution drift between rural and urban areas alike, and no one can miss them. Many of the world's most air-polluted cities are in China,[194] and recent research shows that over 1,000,000 Chinese people die each year from air-pollution related respiratory diseases.[195] In 2014, one group of Chinese scientists reported that air pollution had become so intense that it resembled the effects of "nuclear winter," interfering with plant photosynthesis and potentially threatening the nation's food supply.[196] A study by the Shanghai Academy of Social Sciences concluded that the level of air pollution on bad days had made the city of Beijing almost "uninhabitable for human beings."[197]

Chinese air contains an alarming variety of dangerous toxins, including organic carbon, zinc, molybdenum, stannum (tin), magnesium, iron, titanium, cobalt, cadmium, titanium, manganese, selenium, and aluminum.[198] Some of

[193] *E.g.*, SHAPIRO, *supra* note 58, at 7 (describing the prevalence of lung diseases such as tuberculosis and cancer in so-called Chinese 'cancer villages,' in which pollution-related cancer deaths far exceed the national average—by 2010, 459 cancer villages distributed across 29 of China's 33 provinces had been documented by the media).

[194] SHAPIRO, *supra* note 58, at 7 (noting that 20 of the world's 30 most polluted cities are in China, primarily associated with heavy coal use, and identifying the coal-mining city of Linfen, Shanxi as the dirtiest in the world).

[195] ROBERT A. ROHDE & RICHARD A. MULLER, AIR POLLUTION IN CHINA: MAPPING OF CONCENTRATIONS AND SOURCES 1 (2015), http://berkeleyearth.org/wp-content/uploads/2015/08/China-Air-Quality-Paper-July-2015.pdf; Dan Levin, *Study Links Polluted Air in China to 1.6 Million Deaths a Year*, N.Y. TIMES (Aug. 13, 2015), http://www.nytimes.com/2015/08/14/world/asia/study-links-polluted-air-in-china-to-1-6-million-deaths-a-year.html.

[196] Jonathan Kaiman, *China's Toxic Air Pollution Resembles Nuclear Winter, Say Scientists*, GUARDIAN (Feb. 25, 2014), https://www.theguardian.com/world/2014/feb/25/china-toxic-air-pollution-nuclear-winter-scientists.

[197] Li Jing, *Pollution Makes Beijing Almost 'Uninhabitable for Human Beings'*, S. CHINA MORNING POST (Feb. 12, 2014), http://www.scmp.com/news/china/article/1426587/pollution-makes-beijing-almost-uninhabitable-human-beings.

[198] Shaowei Wu et al., *Chemical Constituents of Ambient Particulate Air Pollution and Biomarkers of Inflammation, Coagulation and Homocysteine in Healthy Adults: A Prospective Panel Study*, BIOMED CENT. (Dec. 12, 2012), http://particleandfibretoxicology.biomedcentral.com/

these chemical contaminants aren't even visible to the naked eye, but a substantial amount is notoriously visible, especially in the volumes in which contaminants are released. What we see then is one of the most grievous manifestations of air pollution in China—fine particulate matter—a mix of solid particles and liquid droplets that cause adverse health effects upon inhalation.[199]

Particles that measure up to 10 micrometers across can harmfully lodge in the lungs.[200] (By comparison, a human hair measures about 70 micrometers across.[201]) But the most dangerous pollution includes fine particulate matter that is even smaller, measuring no more than 2.5 micrometers across (commonly abbreviated as "PM 2.5"), which can cross directly from the alveoli in the lungs into the bloodstream.[202] Fine particulate pollution is associated with respiratory illness, cardiac disease, and stroke,[203] and the risk of harm increases not just cumulatively over time but within any given exposure.[204]

In Beijing and other parts of North China, particulate pollution levels regularly exceed the scale that the U.S. government normally uses to monitor it—such that air quality problems are quite literally "off the scale." At our Fulbright orientation, we were warned that the American Embassy in Beijing had recently added several new gradients just to be able measure the load regularly found in the local air.[205] Shanghai air and other points further south

articles/10.1186/1743-8977-9-49.

[199] *Particulate Matter (PM) Basics: What Is PM, and How Does It Get into the Air?*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#PM (last updated Sept. 12, 2016) ("PM stands for particulate matter… the term for a mixture of solid particles and liquid droplets found in the air.").

[200] *Particulate Matter (PM10 and PM2.5)*, AUSTL. GOV'T DEP'T ENV'T & ENERGY, http://www.npi.gov.au/resource/particulate-matter-pm10-and-pm25 (last updated Oct. 28, 2013) ("Particles in this size range make up a large proportion of dust that can be drawn deep into the lungs.").

[201] *Particulate Matter (PM) Basics: What Is PM, and How Does It Get into the Air?*, *supra* note 199.

[202] Adrienne Mong, *Bathed in Smog: Beijing's Pollution Could Cut Five Years Off Lifespan, Expert Says*, NBC NEWS (Feb. 24, 2012, 3:01 AM), http://behindthewall.nbcnews.com/_news/2012/02/24/10484609-bathed-in-smog-beijings-pollution-could-cut-5-years-off-lifespan-expert-says?lite (discussing China's positive spin on air pollution reporting, including the former strategic use of only the PM 10 standard); Yu-Fei Xing, et al., *The Impact of PM2.5 on the Human Respiratory System*, 8 J. THORACIC DISEASE 69 (2016) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4740125/ (discussing the impact of PM 2.5 on the alveolar wall).

[203] Douglas W. Dockery & Peter H. Stone, *Cardiovascular Risks from Fine Particulate Air Pollution*, 356 NEW ENG. J. MED. 511 (2007).

[204] Andrea Baccarelli et al., *Exposure to Particulate Air Pollution and Risk of Deep Vein Thrombosis*, 168 ARCHIVES INTERNAL MED. 920 (2008); Xing, *supra* note 202 (study reporting that "PM2.5 was positively related to daily mortality of humans, particularly the elderly," after finding elevated deaths on days with elevated PM 2.5).

[205] *E.g.*, Edward Wong, *On Scale of 0 to 500, Beijing's Air Quality Tops 'Crazy Bad' at 755*, N.Y. TIMES (Jan. 12, 2013) http://www.nytimes.com/2013/01/13/science/earth/beijing-air-pollution-off-the-charts.html?_r=0 (reporting that Beijing air in January of 2013 was measured at 755 on the

fare a little better, but still much worse than the worst air quality days in the worst air quality years of Los Angeles' experience.[206] To help wrap an American mind around what this really means, consider that in Los Angeles, a rough way of measuring how bad air quality on a given day is whether you can see a layer of pale brown haze clinging to the horizon at a distance. On bad days in China, air pollution is so dense that the cumulative effect is an entire landscape of smoke, in which you can barely see the buildings across the street. Sadly, we experienced that measure of pollution in both Shanghai and Beijing, as well as countless other Chinese cities.

The numerical data reveal staggering comparisons. Consider that in 2013, the average PM 2.5 pollution level for the entire United States weighed in at about 9.4 micrograms per cubic meter ($\mu g/m^3$), and the average in Los Angeles was just under nineteen.[207] The worst air pollution day in Los Angeles since measurements began reached a score of 120 $\mu g/m^3$.[208] In 2012, the U.S. Environmental Protection Agency ("EPA") set a nationwide threshold of no more than 12 $\mu g/m^3$ under the National Ambient Air Quality Standards, a target most parts of the country are expected to meet in the coming years.[209] The World Health Organization recommends a level of no more than 25 $\mu g/m^3$.[210] Yet air in Beijing frequently exceeds 200 on the PM 2.5 scale, and these days, levels regularly exceed 400.[211]

Beijing is especially vulnerable to pollution for many of the same geographic reasons as Los Angeles—and then some. The city is far to China's north, where winter heating requires the burning of prodigious amounts of coal, and it is surrounded by regions with substantial heavy industry that emit pollutants to the air.[212] Traffic congestion in Beijing rivals any major city in the world, and

Air Quality Index, a scale based on U.S. EPA standards that had previously topped out at 500).

[206] *See Criteria Air Pollutant Report: Los Angeles County, CA*, GOODGUIDE, http://scorecard.goodguide.com/env-releases/cap/county.tcl?fips_county_code=06037#air_rankings (last visited Nov. 21, 2016) (citing 120 as the highest score ever).

[207] *E.g.*, *Air Pollution and Air Quality Trends*, CITY-DATA.COM, http://www.city-data.com/city/Los-Angeles-California.html (last visited Mar. 19, 2018) (reporting that the level of 2.5 PM in 2013 was 18.9 in Los Angeles and 9.4 in the entire United States); *Air Pollution*, COUNTY L.A. PUB. HEALTH, http://www.publichealth.lacounty.gov/eh/TEA/ToxicEpi/airpollution.htm (last visited Nov. 21, 2016) (showing recent measurements).

[208] *See Criteria Air Pollutant Report: Los Angeles County, CA*, *supra* note 206.

[209] *NAAQS Table*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/criteria-air-pollutants/naaqs-table (last updated Dec. 20, 2016).

[210] *Ambient (Outdoor) Air Quality and Health*, WORLD HEALTH ORG., http://www.who.int/mediacentre/factsheets/fs313/en/ (last updated Sept. 2016) (listing a guideline value of 25 $\mu g/m^3$ for a 24-hour mean).

[211] *E.g.*, T.P., *Beijing's Air Pollution: Blackest Day*, ECONOMIST (Jan. 14, 2013), http://www.economist.com/blogs/analects/2013/01/beijings-air-pollution (discussing air quality exceeding 700); *see infra* text accompanying notes 233–238 (discussing declining air quality in Beijing).

[212] Zheping Huang, *Northern China's Dilemma—If You Want Heat in the Winter, It Comes with*

Chinese automobile emissions have historically been less effectively regulated than they are in the west,[213] although the government has recently made important strides to change this.[214] Even worse for city residents, the city sits in a geographical bowl, like Los Angeles, encircled by mountain ranges that trap air pollution from city automobiles and the surrounding industrial regions. It was widely reported that the government shut down many of those factories during the Beijing Olympics of 2008 to provide cleaner air for the games—but they have since gone back online.[215]

The Fulbright coordinator in Beijing once told me, "If [the scale] is less than 150, I'm usually happy, because that means I can see the sun." But like most well-to-do Beijing residents, he kept air purifiers constantly running in his apartment—and by the end of his time in Beijing in 2015, he had seven.[216] The U.S. State Department actually pays its American Embassy staff in Beijing additional "hardship" compensation for enduring hazardous working conditions, just by virtue of breathing the local air.[217] American Embassy staff in Beijing

Toxic Air Pollution, QUARTZ (Nov. 9, 2015), http://qz.com/544419/northern-chinas-dilemma-if-you-want-heat-in-the-winter-it-comes-with-toxic-fumes/.

[213] *See* Sarah Zheng, *China Now has Over 300 Million Vehicles... That's Almost America's Total Population*, SOUTH CHINA MORNING POST (April 19, 2017), www.scmp.com/news/china/economy/article/2088876/chinas-more-300-million-vehicles-drive-pollution-congestion (reporting on traffic data showing that 10 of the 25 most congested cities globally are in China); *China to Require Tougher New Vehicle Emission Standards for 2020*, REUTERS (Dec. 23, 2016), https://www.reuters.com/article/us-china-autos-emissions/china-to-require-tougher-new-vehicle-emission-standards-for-2020-idUSKBN14C0Q4 (noting that while China has been the world's leading car manufacturer since 2009, its lagging pollution control technology has exacerbated air pollution levels--for example, auto emissions accounted for 30% of Beijing's concentration of PM 2.5 in 2016).

[214] *See* Samuel Shen & Kazunori Takada, *Global Auto Component Makers Gear Up for China's Tougher Emission Rules*, REUTERS (June 8, 2014), http://www.reuters.com/article/uk-china-autos-pollution-idUSKBN0EJ0WN20140608 (discussing Chinese regulatory efforts to tighten emission standards); Hiroko Tabuchi, *China, Moving to Cut Emissions, Halts Production of 500 Car Models*, N.Y. TIMES (Jan. 2, 2018), https://www.nytimes.com/2018/01/02/climate/china-cars-pollution.html (demonstrating the real teeth in China's new emissions control regulations).

[215] Austin Ramzy, *Beijing's Olympic War on Smog*, TIME (Apr. 15, 2008), http://content.time.com/time/world/article/0,8599,1730918,00.html (discussing efforts to combat smog before the Olympics); Bob Davis, *Most of Beijing's Olympic Pollution Cleanup Evaporated a Year Later*, WALL STREET J. (Mar. 29, 2011), http://blogs.wsj.com/economics/2011/03/29/most-of-beijings-olympic-pollution-cleanup-evaporated-a-year-later/ (discussing the return of pre-Olympic pollution levels a year later).

[216] Email from Nathan Keltner, Fulbright Cultural Affairs Specialist, Public Affairs Section, U.S. Embassy, Beijing, to author (Aug. 8, 2016, 1:23 pm) (on file with author).

[217] Hardship salary differentials for staff in foreign posts (who are not ordinary residents there) that have difficult environmental conditions are authorized by 5. U.S.C. § 5925(a) ("A post differential may be granted on the basis of conditions of environment which differ substantially from conditions of environment in the continental United States and warrant additional pay as a recruitment and retention incentive."); *Post Hardship Differential*, U.S. DEP'T ST., https://aoprals.state.gov/content.asp?content_id=260&menu_id=75 (last updated Sept. 26, 2010) ("A hardship differential is established for any place when, and only when, the place involves extraordinarily difficult living conditions, excessive physical hardship, or notably unhealthful

received a bonus of 15% over their usual salaries in 2016, half of which was specifically designated for dealing with air pollution, and the differential rises to 25% for employees stationed in other parts of China that are even more isolated and polluted than Beijing.[218] My friend recalled that a few years earlier, differentials for American Consulate staff in Shenyang and the extremely polluted city of Wuhan had hardship differentials of up to 30% and even 35%.[219] Today, the only posts with similar hardship differential pay are violence prone areas in Iraq, Afghanistan, and Indonesia.[220]

B. People Power and Airpocalypse in Beijing

In recent years, unprecedented public protests have begun to erupt all over China about the increasingly degraded environment.[221] Public outrage about air quality has been especially forceful, and especially pronounced in Beijing. During our time there, we witnessed a groundbreaking demonstration of the political power that an angry public can wield—even in protest-leery, post-Tiananmen China—after palpable public unrest in Beijing finally persuaded the Chinese government to change its air quality monitoring norms.[222]

For years, China had monitored only airborne particulates that measured up to 10 micrometers across, and those reports painted a rosier picture about air pollution levels in cities like Beijing. The PM 10 standard was the old

conditions affecting the majority of employees officially stationed or detailed at that place."); *Post (Hardship) Differential (DSSR 500) Percentage of Basic Compensation*, U.S. DEP'T ST. (Mar. 18, 2018), https://aoprals.state.gov/web920/hardship.asp (listing hardship differentials for Beijing at 15%, and up to 25% for even more isolated and polluted parts of China). *See also 3 FAM 3210*, U.S. DEP'T ST. (Aug. 28, 2017), https://fam.state.gov/fam/03fam/03fam3210.html (detailing the Foreign Affairs Manual's explanation of post hardship differentials for unhealthy living conditions); *3 FAM 3260*, U.S. DEP'T ST. (Nov. 23, 2015), https://fam.state.gov/fam/03fam/03fam3260.html (further discussing hardship differentials). The U.S. government is not the only employer compensating staff for breathing China's unhealthy air. *See* Peter Ford, *Beijing Is Booming, but Talent Is Leaving Due to Bad Air*, CHRISTIAN SCI. MONITOR (Apr. 4, 2013), http://www.csmonitor.com/World/Asia-Pacific/2013/0404/Beijing-is-booming-but-talent-is-leaving-due-to-bad-air (reporting that companies are offering hazard pay in an attempt to keep expatriate employees from leaving China).

[218] *See Post (Hardship) Differential (DSSR 500) Percentage of Basic Compensation*, *supra* note 217; My friend at the Embassy recalled that in Beijing, 7.5% of the differential was attributed to air pollution and 7.5% to enduring "political interference." *See* Email from Nathan Keltner, *supra* note 216.

[219] *See* Email from Nathan Keltner, *supra* note 216.

[220] *Post (Hardship) Differential (DSSR 500) Percentage of Basic Compensation*, *supra* note 217.

[221] Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 194–96.

[222] *See* Jamie A. FlorCruz, *Beijing's New Year Surprise: PM 2.5 Readings*, CNN (Jan. 27, 2012, 1:30 AM), http://www.cnn.com/2012/01/27/world/asia/florcruz-china-pollution (describing Beijing's decision to report PM 2.5 data as "a timely response of the government to a public outcry"); Chu Long, *What the Smog Can't Conceal*, CHINADIALOGUE (Jan. 19, 2012), http://www.chinadialogue.net/article/show/single/en/4734-What-the-smog-can-t-conceal- (describing the gulf between reported air quality and the reality experienced by city residents as "a sharply divisive issue").

international norm, before science had established that it is the smaller PM 2.5 particles that can do the most damage.[223] However, the U.S. Embassy in Beijing monitors fine particulate matter and reports it on an hourly basis using the newer PM 2.5 standard, making the data available to the public over the Internet.[224] The American reports made local air quality problems look a lot more serious than the Chinese reports, and people in Beijing began to notice.[225]

The winter of 2011 was worse than usual—sadly foreshadowing how much worse things would get in the years afterward. The U.S. Embassy data showed sustained levels of seriously hazardous pollution—the kind that could harm any healthy person, not just the especially sensitive young, old, or sick.[226] Air filter sales surged in Beijing, and residents donned surgical masks in (mostly futile) efforts to reduce their inhalation of choking auto exhaust, coal-fired power plant and manufacturing emissions, and dust from the ubiquitous construction projects and nearby Gobi desert.[227] A *New York Times* report that managed to jump the Great Firewall told of some Party officials who had retrofitted their homes with equipment to cleanse the toxic air, infuriating the ordinary masses who had to breathe it without recourse.[228]

As public agitation mounted, the Chinese government reportedly requested that the U.S. Embassy stop publishing its PM 2.5 monitoring data (likening it to inappropriate meddling in domestic affairs).[229] Beijing residents were enraged

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[223] *See supra* notes 199–204 and accompanying text (discussing particulate matter and PM standards).

[224] *Mission China: Beijing*, U.S. DEP'T ST. AIR QUALITY MONITORING PROGRAM, http://www.stateair.net/web/post/1/1.html (last visited Mar. 3, 2018) (providing hourly updates of PM levels and maintaining historical data files for each year).

[225] *See* Barbara Demick, *U.S. Embassy Air Quality Data Undercut China's Own Assessments*, L.A. TIMES (Oct. 29, 2011), http://articles.latimes.com/2011/oct/29/world/la-fg-china-air-quality-20111030 ("One day this month the [fine particulate matter] reading was so high compared with the standards set by the U.S. EPA that it was listed as 'beyond index' [but] China's own assessment that day… was that Beijing's air was merely 'slightly polluted.'").

[226] *Extremely High Levels of PM2.5: Steps To Reduce Your Exposure*, U.S. EMBASSY & CONSULATES CHINA, https://china.usembassy-china.org.cn/embassy-consulates/beijing/air-quality-monitor/extremely-high-levels-pm2-5-steps-reduce-exposure/ (last visited Mar. 10, 2018).

[227] *See* Zheng Xin, *Smoggy Days Spur Surge in Air Filter Sales*, CHINA DAILY USA (Jan. 19, 2012), http://usa.chinadaily.com.cn/epaper/2012-01/19/content_14477438.htm (noting that concern over smog had caused the sale of high end air purifiers to skyrocket, from 22 billion yuan in 2010 to 26 billion yuan in 2011); Paula Nelson, *China's Skies: Toxic Levels of Pollution*, BOSTON.COM (Jan. 25, 2013), http://www.boston.com/bigpicture/2013/01/chinas_skies_toxic_levels_of_p.html (showing crippling air pollution).

[228] Andrew Jacobs, *The Privileges of China's Elite Include Purified Air*, N.Y. TIMES (Nov. 4, 2011), http://www.nytimes.com/2011/11/05/world/asia/the-privileges-of-chinas-elite-include-purified-air.html (describing extreme public resentment of the use of high-end air purifiers in the homes and offices of China's top leaders); *see generally* Sui-Lee Wee & Adam Jourdan, *China's Environmental Secrecy Sparks Public Anger*, HUFFINGTON POST (Mar. 9, 2013), http://www.huffingtonpost.com/2013/03/10/china-environment-secrecy_n_2846121.html (discussing public outrage about Beijing air quality in early 2012).

[229] Keith Bradsher, *China Asks Other Nations Not to Release Its Air Data*, N.Y. TIMES (June 5,

by these purported efforts to keep them in the dark about genuine threats to public health.[230] In the Twitter-like microblogs that dominate the Chinese blogosphere, one after another vented their outrage—mothers wanting to keep young children inside when the air was most hazardous, sons wanting to keep aging mothers at home on the days of elevated stroke risk.[231] In a stunning victory for transparency in Chinese governance—and an important signal of how seriously average Chinese people are taking air quality—the government reversed itself and finally began monitoring at the PM 2.5 level.[232]

I lectured in Beijing several times in 2012, enough to viscerally appreciate the grievances of the Beijing public. Air quality varied widely from one day to the next, with throat-choking chemical plumes that might pass overnight, leaving sunny morning skies that were pale but blue. On one visit, my friend at the Fulbright Office showed me photos from his apartment window near the center of the city. The first was taken on a clear day, with the PM 2.5 smog index around 60. Even though 60 is more than six times the U.S. national average, the images are clear, and the sky is recognizably blue. The second was taken a few days later, when the index was over 400, and all that is visible are the ghostly outlines of nearby buildings.[233] That afternoon, I left Beijing on an average winter day, when the air quality index hovered between 150-200. According to the U.S. Embassy, the air was "unhealthy" air for any segment of the population. But my friend at Fulbright was happy, because at least he could see the sun.

Air quality on days like these was seemingly horrendous at the time, but it would soon be dwarfed by unimaginably horrendous conditions in the years

2012), http://www.nytimes.com/2012/06/06/world/asia/china-asks-embassies-to-stop-measuring-air-pollution.html?_r=1& (reporting on the Chinese Government's complaints about foreign embassies' public dissemination of air quality monitoring reports as inaccurate and in violation of international law); *China Warns US Embassy to Stop Reporting Beijing Pollution*, INDEPENDENT (June 5, 2012), http://www.independent.co.uk/news/world/asia/china-warns-us-embassy-to-stop-reporting-beijing-pollution-7817716.html (noting China's objections as the U.S. Embassy posted hourly readings to a Twitter-like feed with nearly 20,000 followers).

[230] *See, e.g.*, Wee & Jourdan, *supra* note 228 (noting the ironic controversy over releasing accurate data, because some people thought that the release would "lead to panic in the society," when in reality, the secrecy caused panic).

[231] *See, e.g.*, SHAPIRO, *supra* note 58, at 104 (discussing how the use of Weibo, the Chinese version of Twitter, has enabled public dialogue with the government over environmental frustration and fueled public venting), 41 (noting that a Chinese micro-blogger's poll on whether the government should adopt stricter air controls elicited tens of thousands of votes for immediate adoption, prompting city promises to regulate vehicular pollution). *But see* Wee & Jourdan, *supra* note 228 (discussing the risks of engaging in public dialogue about air quality). Wee and Jourdan describe that four days after one Mr. Chen Yuqian used Weibo to challenge local environmental officials to swim in a stretch of polluted river (and offering a 48,200 reward), his home was attacked.

[232] Wee & Jourdan, *supra* note 228; Guo Kai, *China Decides to Accept PM2.5*, PEOPLE'S DAILY ONLINE (Dec. 23, 2011), http://english.peopledaily.com.cn/90882/7685519.html.

[233] For analogous published photos, *see* Max Fisher, *The Most Shocking Photo of Beijing Air Pollution I've Ever Seen*, WASH. POST (Feb. 28, 2013), https://www.washingtonpost.com/news/worldviews/wp/2013/02/28/the-most-shocking-photo-of-beijing-air-pollution-ive-ever-seen/.

immediately afterward. In 2013, the PM 2.5 index began exceeding 800, and thousands of patients with respiratory issues began pouring into area hospitals on a daily basis.[234] What had previously been the air pollution problem was locally rebranded "the Airpocalypse."[235] In 2013, all hoped it was a bad year fluke, but the pattern repeated in 2014 and again in 2015, with reported readings exceeding 900 in Beijing, and as high as 1,400 in Shenyang.[236]

In late February of 2015, Chai Jing, a well-known China Central Television News journalist, released over the Internet a feature-length, *Inconvenient Truth*-style documentary about Chinese air pollution called *Under the Dome*.[237] The film begins with Jing's wrenching personal story of her awakening to the seriousness of the problem as she struggled with her newborn daughter's health crisis, and then goes on to detail the staggering extent of the crisis and its equally daunting human health impacts.[238] She explains the toxic chemicals in the air that hundreds of millions of Chinese cannot escape breathing, and how they can shunt human life.[239] The film decries the contributions of the coal and oil industries and unflinchingly catalogs the failure of environmental regulators to protect the public.[240] In the first forty-eight hours after it was posted, the film was viewed more than one hundred million times.[241]

Overnight, China was set on fire with indignation as people came to understand just how dangerous the air they were breathing really was. In total, *Under the Dome* was viewed two hundred million times during the six days in which the government allowed it to remain online before censors removed it on March 6th.[242] Before it was censored, however, the new Minister of the

[234] Louisa Lim, *Beijing's 'Airpocalypse' Spurs Pollution Controls, Public Pressure*, NAT'L PUB. RADIO (Jan. 14, 2013, 4:00 AM), http://www.npr.org/2013/01/14/169305324/beijings-air-quality-reaches-hazardous-levels (describing air pollution reaching levels 25 times that considered safe in the U.S.).

[235] *Id.*; Thomas Barrabi, *Airpocalypse in China: Air Pollution Linked to 1.2M Deaths, Study Says*, INT'L BUS. TIMES (Apr. 2, 2013), http://www.ibtimes.com/airpocalypse-china-air-pollution-linked-12m-deaths-study-says-1166535#.

[236] *See* Edward Wong, *'Airpocalypse' Smog Hits Beijing at Dangerous Levels*, N.Y. TIMES (Jan. 16, 2014, 4:52 AM), http://sinosphere.blogs.nytimes.com/2014/01/16/airpocalypse-smog-hits-beijing-at-dangerous-levels/?_r=0; *see generally* Phillips, *supra* note 1 (reporting that PM 2.5 readings surpassed 1,400 micrograms per cubic meter, 56 times the levels considered safe by the WHO, in the province of Shenyang).

[237] Steven Mufson, *This Documentary Went Viral in China. Then It Was Censored. It Won't Be Forgotten*, WASH. POST (Mar. 16, 2015), https://www.washingtonpost.com/news/energy-environment/wp/2015/03/16/this-documentary-went-viral-in-china-then-it-was-censored-it-wont-be-forgotten/?utm_term=.5550088f2f7d.

[238] Chai Jing, *Under the Dome—Investigating China's Smog* (Mar. 1, 2015), https://www.youtube.com/watch?v=T6X2uwlQGQM.

[239] *Id.*

[240] *Id.*

[241] Celia Hatton, *Under the Dome: The Smog Film Taking China by Storm*, BBC NEWS (Mar. 2, 2015), http://www.bbc.com/news/blogs-china-blog-31689232.

[242] Andrew Browne, *Pollution Film Too Popular for Beijing's Comfort*, WALL STREET J. (Mar.

Environment, Chen Jining, had already praised the film and phoned Jing to personally thank her for this important contribution to China's campaign against pollution.[243] Several weeks after it was censored, at a press conference following the National People's Congress, foreign journalists pressed Premier Le Keqiang for a response to the film, and he declined to criticize it.[244] Instead, he pledged to redouble government efforts to clean up the air, invoking the war on pollution in telling reporters:

> "I want to tell you that the Chinese government is determined to tackle environmental pollution, and tremendous efforts have been made in this regard. The progress we have made still fall [sic] far short of expectation of our people. Last year I said that the Chinese government would declare a war against environmental pollution. We are determined to carry forward our efforts until we achieve our goal."[245]

Chinese who travel abroad explain that those who don't may accept these bad conditions, as well as official accounts that pollution is "fog" rather than "smog," because the air has been bad for so long that they have lost all sense of how it could be different. Indeed, Chai Jing talks in the film with small children who have never in their lives seen a real blue sky with story-book cumulus clouds.[246] But *Under the Dome* filled this void with full information, visuals, and data, threatening to educate hundreds of millions of Chinese who had never experienced clean air about the urgency of the crisis.

Conditions were bad in China long before the film, but the Airpocalypse created the tinderbox to which *Under the Dome* became a lighted match. The very fact that the film was allowed to remain online for nearly a week before being removed prompted speculation about a power struggle within the government, perhaps over whether it was more useful or more dangerous to unleash the public fury certain to follow increased access to the film's contents.[247]

C. Breathing Air With Heft

Beijing's notoriously bad air quality was never far from my family's mind in deciding where to spend our next year in China. In fact, though I had been offered connections to leading universities in Beijing when my Fulbright placement was being set, we decisively pursued our placement in Qingdao, as

17, 2015, 12:38 AM), http://www.wsj.com/articles/chinas-world-pollution-film-under-the-dome-too-popular-for-beijings-comfort-1426567136.

243 Hatton, *supra* note 241.

244 Mufson, *supra* note 237.

245 *Id.*

246 *Id.*

247 Browne, *supra* note 242.

much for the city's famously clean air as for Ocean University's vibrant environmental law program. And indeed, when we first arrived in Beijing in early August, the wisdom of our choice seemed confirmed. Our introductory week in Beijing—while thrilling on a cultural level—was chilling on an environmental level.

None of my ample armchair research into Beijing's air quality problems had prepared me for the experience of actually breathing its toxic brew, air so laden with unwelcome extras that it seemed to have physical heft. Air with taste and texture, two things air should never have. Air that we knew—our bodies as physically as our minds did intellectually—would eventually make us sick. We spent that week in Beijing reluctantly breathing air with heft, and wondering about the consequences. We were elated to finally get to coastal Qingdao, where indeed, the summer air was comparatively pristine. But even in Qingdao, everything changed in late November, when the heat went on in northern China. In China, the heat (like most else) is centrally coordinated.[248] Interior heating for the entire northern part of the country is centrally turned on around November 15th, bringing to life the countless coal-fired power plants that freckle every city landscape. Some are quite large, but many are small and seemingly innocuous during the summer months when they lie dormant.

One such sleeper turned out to be directly across from my son's preschool. Its curiously broad smokestack was raised just above the higher floors of the surrounding residential apartments. It looked old and was not in use when we first arrived, so we had assumed that it was part of a retired factory, abandoned after residential infill. But in mid-November, the little smokestack awoke as the local heating station came back online. Once we realized that an eye-level conduit for mercury-laden, throat-choking coal dust was aimed at our son's preschool, we panicked and considered our alternatives. But we quickly realized that short of leaving northern China, there weren't really any alternatives. The truth was that these small local generators were everywhere. There were so many, and they were so old, that installing appropriate scrubbers would require a massive financial commitment (one that evidently had not been made at the time).

And so we settled in for the long winter. As the previous section shows, it's easy to cite the mind-boggling statistics of how bad the air quality can get in China.[249] It's harder to describe the actual experience of it (and harder still to

[248] *See Guide to Heating, Electricity, Water, and Gas Policies and Procedures*, BEIJING INT'L, http://www.ebeijing.gov.cn/feature_2/GuideToHeatingElectricityWaterAndGas/IntroductionAndGeneralInformation/t1107552.htm (last visited Nov. 21, 2016); Douglas Almond et al., *Winter Heating or Clean Air? Unintended Impacts of China's Huai River Policy*, 99 AM. ECON. REV. 184, 185 (2009), https://www.aeaweb.org/articles?id=10.1257/aer.99.2.184 (discussing mandated heating period from November 15th to March 15th).

[249] *See supra* Part IV(B). *See also* James Fallows, *Two Charts That Put the Chinese Pollution Crisis in Perspective*, ATLANTIC (Apr. 18, 2014), https://www.theatlantic.com/international/

endure it). A gnawing anxiety sets in when the air begins to go bad. You hope against hope that this time will not last as long as the last time, and you unconsciously start to breathe more shallowly. Then you assume a bunker mentality and try to keep the bad air out of your home as much as possible. You close all the windows and become obsessively diligent about closing doors as fast as possible when you come and go from the apartment.

Every day, you have to concede the struggle when you leave the house for work in the morning—but eventually it doesn't matter, because the bad air ultimately finds a way through the cracks into every room. In large enclosed spaces like airports, the haze is palpable enough that it can obstruct your view of the far interior wall. At this point, you just have to submit to the situation, trying not to think about what's actually in the air. There is nowhere to go, nothing you can do to avoid it. But you still try not to breathe too deeply.

After the winter heat went on, the blue skies of Qingdao disappeared behind a grainy haze of automobile fumes and coal dust. On the worst days the weather report was simply "smoke,"[250] and breathing was like inhaling the wake of buffed chalkboard erasers that have been tainted with some kind of chemical. We used packing tape to try and seal the faulty window frames and gaps around our doors. Surfaces in our home were perpetually coated with formerly airborne dust and particulates.

We were no longer so keen to take walks to the lovely mountain behind the university (which we very often couldn't even see).[251] We began to avoid strenuous exercise—even running to catch the bus—because deep breathing could be physically painful. On days when we could only hazily see the building fifteen meters from our own (and everything beyond it disappeared fully into the smoke), we tried our best to not even leave the apartment.

In the early days of winter, the stress of adjusting to the air pollution was oppressive. We felt sick most of the time, and we were unusually anxious. Eventually, we adapted to the circumstances and once again found joy and fascination in our new world. But even then, we would finish most days by lying down in bed to cough the day's residue out of our lungs. And on many mornings, I wrestled with the decision to send my son to preschool, which

archive/2014/04/2-charts-that-put-the-chinese-pollution-problem-in-perspective/360868/ ("No one now alive has experienced anything similar in North America or Europe, except in the middle of a forest fire or a volcanic eruption.").

[250] *Cf.* Jo, *The Smoke Is Nothing New*, OUTSIDE IN (June 13, 2012), http://outside-in.typepad.com/outside_in/2012/06/the-smoke-is-nothing-new.html (noting the use of "smoke" as a weather forecast).

[251] Contrasting photos of Fushan in good and bad air conditions are available on one of my original blog posts: Erin Ryan, *China Environmental Experiences #3: Breathing Air With Heft*, ENVTL. L. PROF BLOG (Apr. 7, 2012), http://lawprofessors.typepad.com/environmental_law/2012/04/china-environmental-experiences-3-air-with-heft-taste-and-texture.html (shown halfway down, at "But even in Qingdao…"); *see also* Fisher, *supra* note 233.

required both him and my mother to troop a half-mile up a steep hill directly toward the belching power plant.

In late 2011, while preparing for my environmental law class that day, I received word that EPA had finally promulgated new atmospheric mercury regulations, after twenty years of trying.[252] I veritably jumped for joy—and then actually wept with grief as I made the connection between the primary source of U.S. mercury—coal-fired power plant emissions—and my family's life in China. I thought of all the environmental risks to which I was subjecting my little boy, who turned four that winter. It all seemed so ironic, after all our fastidious caretaking in his first three years—organic dairy, physician-approved sunscreen, no cigarette or pesticide exposure, and the like. What was the point, I thought, when we were now subjecting him to more hazard than we had ever imagined in our previously sheltered lives? Almost every day that January, I questioned whether I had done the right thing in bringing him to China. About every other day, I was pretty sure that I hadn't.

Then again, we took the objectives of our cultural diplomacy there very seriously. Even then, we understood that raising a child there had enabled us to access a depth of Chinese culture that most visitors never come close to understanding, and was allowing our son to experience the wider world in a way that would deepen him forever. When his teachers engaged him across the language barrier, when he played with neighborhood children, when we compared parenting notes with other families, when strangers approached to ask about his hair—each exchange was a gift that offset our fear. We were learning China in a way we had never imagined, and we were sharing our American ideals just as profoundly. Moreover, we knew that the results would redound long afterward, as each of us carried these insights into the future. At that moment, my son was a living bridge between our cultures, in a way that filled our community with joy and faith in the future of our nations' friendship. So I reminded myself that the air pollution was really very temporary for us, and that we would be home in just a few more months.

And then I wrestled with the crushing guilt of knowing that all the people I had come to love in China did not have the same luxury.

That winter, I posted a blog urging every American then bellyaching about the costs of environmental regulation in the United States[253] to spend a year living in China. From my vantage point, the proposition that Americans no

[252] *Mercury and Air Toxics Standards: Cleaner Power Plants,* U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/mats/cleaner-power-plants (last updated June 12, 2017); NESHAP Final Rule for Power Plants, *supra* note 60.

[253] *See, e.g.*, George Black, *Death to the Job-Killing EPA?* ONEARTH (June 12, 2012), http://archive.onearth.org/article/death-to-jobs-death-to-the-epa (discussing pervasively negative perceptions of the EPA and noting that a google search of "job-killing EPA" returned 50,500 hits).

longer need so much environmental law because our environment is so clean[254] (thanks, of course, to environmental law. . .) made me want to break something. I tried to muster empathy for those making this argument, because they probably had no means of perspective on how eliminating environmental regulations would impact their daily lives. Which is why, I explained, they should spend at least a winter China—and preferably with their small children and aging parents. (Then, I imagined, we'd see how much they really missed the Clean Air Act.)

But in Qingdao in early 2012, without the benefit of enforced environmental regulations, we learned simply to pray for cold weather. The northerly winds from Siberia would blow the smoke out to sea and provide a day or two of respite, so freezing cold became our new favorite weather forecast. Qingdao's formerly renowned clean air may have resulted from that standard winter weather pattern—but weather patterns shifted in 2012, as they have been the world over.[255] Whether for climate change or other reasons, the winds that once regularly purged Qingdao's smog barely blew that winter, and the air quality plummeted accordingly. I was told by OUC faculty that in just the first quarter of the year, bad air days had already exceeded the previous year by a factor of four. Since then, air quality problems have gotten even worse, and Qingdao has lost its reputation for comparatively clean skies.[256] Residents complained bitterly about the problem, even prompting some new local regulations.[257] But as one of my students wryly observed, "Would they rather their homes have no heat?"

It was a sobering point. Northern Chinese winters get bitterly cold, far colder than equivalent latitudes in the United States which are favored by the jet stream.[258] And our Chinese friends always felt colder than we did (no doubt because we came with more corporeal padding). Understandably, most of our

[254] *See, e.g.*, Heidi Garrett-Peltier, *The EPA: A Phantom Menace*, TRUTHOUT (Aug. 30, 2011), http://www.truth-out.org/news/item/3026-the-epa-a-phantom-menace (discussing the argument that environmental regulation kills jobs); Jack Spencer, Romina Boccia & Robert Gordon, *Environmental Conservation Based on Individual Liberty and Economic Freedom*, HERITAGE FOUND. (Jan. 14, 2013), http://www.heritage.org/research/reports/2013/01/environmental-conservation-based-on-individual-liberty-and-economic-freedom (arguing that the U.S. is overregulated and that environmental laws threaten private property).

[255] *See, e.g.*, Jordan Nichols, *"Wacky Weather" Here to Stay*, CLIMATE SCI. & POL'Y WATCH (Nov. 6, 2012), http://www.climatesciencewatch.org/2012/11/06/wacky-weather-here-to-stay/ (discussing changing climate and weather patterns associated with global warming).

[256] *Cf. A Year After China's 'Iron Hand' Hit Polluters, Air Still Chokes*, BLOOMBERG (Mar. 7, 2016), http://www.bloomberg.com/news/articles/2016-03-08/a-year-after-china-s-iron-hand-hit-polluters-air-still-chokes (using a photo of Qingdao to depict worsening air quality problems).

[257] *See, e.g.*, *Qingdao Set to Improve Air Quality*, THAT'S QINGDAO, http://www.thatsqingdao.com/2012/03/qingdao-improves-air-quality/ (last visited Mar. 20, 2018) (reporting on new rules banning high emissions vehicles in the Shinan District Tourist Zone).

[258] *Why U.S. East Coast Is Colder Than Europe's West Coast*, LIVE SCI. (Apr. 5, 2011), https://www.livescience.com/13573-east-coast-colder-europe-west-coast.html (noting that the same jetstream-related phenomenon "happens over the Pacific, where winters on the northeastern coast of Asia are much colder than in the Pacific Northwest.")

Chinese friends would never have traded away central heating, the downsides notwithstanding.

D. Darkest Before Dawn?

As bad as air quality is in China, there are hopeful signs on the horizon. China is taking meaningful steps to shift away from the most polluting fossil fuels (at a pace that shames stalled efforts in the United States).[259] The nation's first clear commitment to reducing greenhouse gas production appeared in the Twelfth Five-Year Plan, the government's stated policy goals for the period spanning 2011-15.[260] With the goal of reducing carbon emissions 17% over that period and 40–45% by 2020, the central government initiated experimental carbon trading and taxing programs in seven large metropolitan areas.[261] The early experiments encountered both successes and challenges, many related to familiar problems of local enforcement,[262] but the new amendments to the Environmental Protection Law and the Civil and Administrative Procedure Laws may revolutionize the enforcement of anti-pollution laws, and additional regulatory goals under the Thirteenth Five-Year Plan provide more incentives to bring local officials on board.[263]

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[259] *See infra* notes 473–478 and accompanying text (discussing Chinese progress on renewable energy policy at the same time the United States retreats from the Clean Power Plan, Paris climate accord, and other regulatory efforts to shift from fossil fuels to renewables).

[260] CHINA'S TWELFTH FIVE-YEAR PLAN, *supra* note 4, at 3 ("In transforming the economic development mode, the importance of building a resource-saving and environment-friendly society should be stressed to save energy, reduce greenhouse emissions and actively tackle global climate change. We should develop circular economy and low carbon technologies.").

[261] *See* Joanna Lewis, *Energy and Climate Goals of China's Twelfth Five-Year Plan*, CTR. FOR CLIMATE & ENERGY SOLUTIONS (March 2011), http://www.c2es.org/international/key-country-policies/china/energy-climate-goals-twelfth-five-year-plan (setting a 17% carbon reduction goal from 2011-2015 as an interim measure to achieve a 40–45% reduction by 2020); James Murray, *China Paves Way for Carbon Market,* GREENBIZ (July 12, 2012), http://www.greenbiz.com/blog/2012/07/13/china-regulations-carbon-market (describing China's efforts to launch carbon trading schemes in several cities); *China to Levy Carbon Tax Before 2015—Report*, REUTERS (Jan. 5, 2013) http://www.reuters.com/article/2012/01/05/china-carbon-idUSL3E8C5D1220120105 (reporting on plans to begin measuring industrial carbon emissions to facilitate pilot carbon markets and taxes); *Thirteenth Five-Year Plan (Executive Summary)*, LONDON SCH. ECON. & POL. SCI., www.lse.ac.uk/GranthamInstitute/law/13th-five-year-plan/ (last visited May 16, 2018) ("The 13th Five-Year Plan also tasks the government with developing rules and regulations to manage the national carbon trading program to be developed based on expansion of the existing seven pilot schemes and expected to be launched around 2018.").

[262] Gloria Gonzalez, *China's Grand Carbon Trading Experiment Experiences Highs and Lows*, ECOSYSTEM MARKETPLACE, (Oct. 22, 2014), http://www.ecosystemmarketplace.com/articles/chinas-grand-carbon-trading-experiment-experiences-highs-lows/ (noting that "pilots in Guangdong, Shanghai and Shenzhen have made significant progress in building a cap-and-trade market," but that experts "are finding plenty of room for improvement").

[263] *See supra* notes 129–139 and accompanying text (discussing the amended Environmental Protection Law), notes 162-168 and accompanying text (discussing the amended Civil and Administrative Procedure Laws), *and infra* note 264 (discussing China's Thirteenth Five-Year Plan).

Under the Thirteenth Five-Year Plan, China plans to enact a national cap-and-trade program involving six of its largest carbon-emitting industrial sectors, including coal-fired power generation.[264] Further advancing efforts under the new Plan to shift away from fossil fuels, China announced a stunning plan to invest 2.5 trillion yuan (U.S. $361 billion) into renewable power generation by 2020, devoting 40% to solar generation, 30% to wind, 20% for hydropower, and the rest for geothermal and nuclear.[265] China is now the largest investor in domestic renewable energy, and a report by the Institute for Energy Economics and Financial Analysis indicates that it is poised to become the world leader in international investment as well.[266] China played an important role in negotiating the international Paris climate accord, for which it pledged to halt the rise of its emissions by no later than 2030, and to increase its overall share of renewable or nuclear energy sources to 20%.[267] As noted earlier, China also suspended production of 500 different models of cars that failed fuel economy standards and prosecuted environmental violations at some 80,000 different factories in 2017.[268]

In the meanwhile, we should also give credit where it is due for the many ways that Chinese people avoid making the problem even worse—by not living the way that most Americans do.[269] For example, the roofs of all Chinese

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[264] CENT. COMM. OF THE COMMUNIST PARTY OF CHINA, THE THIRTEENTH FIVE-YEAR PLAN FOR ECONOMIC AND SOCIAL DEVELOPMENT OF THE PEOPLE'S REPUBLIC OF CHINA (2016–2020) 137 (2016), http://en.ndrc.gov.cn/newsrelease/201612/P020161207645765233498.pdf ("We will promote the establishment of a national carbon emissions trading scheme, and implement systems for carbon emissions reporting, inspection, verification, and quota management for major carbon-emitters."); John Fialka, *China Will Start the World's Largest Carbon Trading Market*, SCI. AM. (May 16, 2016), https://www.scientificamerican.com/article/china-will-start-the-world-s-largest-carbon-trading-market/, ("China has announced that in 2017, it will launch a national cap-and-trade program involving six of its largest carbon-emitting industrial sectors, beginning with coal-fired power generation."); *see also supra* notes 151-152 (reporting on more recent efforts to reduce emissions through carbon markets and motor vehicle fuel efficiency standards).

[265] *China to Plow $361 Billion into Renewable Fuel*, REUTERS (Jan. 5, 2017), http://www.reuters.com/article/us-china-energy-renewables-idUSKBN14P06P (noting that solar is expected to receive 1 trillion yuan, enough to build 1000 major solar plants, while wind generation will receive 700 billion, and hydropower will receive 500 billion).

[266] Helen Davidson, *China On Track to Lead in Renewables as US Retreats, Report Says*, GUARDIAN (Jan. 9, 2018), https://www.theguardian.com/environment/2018/jan/10/china-on-track-to-lead-in-renewables-as-us-retreats-report-says.

[267] *Id.*

[268] *See supra* notes 148–152 (listing notable new environmental laws and enforcement actions in 2017).

[269] *See, e.g.*, Marc Gunther, *Americans Waste $130 Billion a Year on Energy*, GREENBIZ (July 29, 2009, 11:41 AM), http://www.greenbiz.com/blog/2009/07/29/americans-waste-130-billion-year-energy (discussing U.S. energy-inefficient development); Jason Jeffery Semon, *If Everyone Lived Like Americans, How Many Earths Would We Need?*, PENN ST. U. BLOG (Oct. 24, 2012), http://www.personal.psu.edu/afr3/blogs/siowfa12/2012/10/if-everyone-lived-liked-americans-how-many-earths-would-we-need.html (noting that the average American consumes as much energy as 13 Chinese).

buildings are barnacled with rows and rows of solar water heaters, avoiding the need for yet more coal-fired electricity.[270] In Rizhao, a city of 2 million people bordering Qingdao, solar heaters are installed on at least 95% of all buildings, while rates in U.S. cities outside of Honolulu barely break into the single digits.[271]

Even beyond their use of renewables, Chinese people consume far less electricity in the home than the average American. All interior lighting is fluorescent, and while we grew occasionally weary of our interior world's bluish tint, we could not deny the impressive energy savings over the indulgent incandescent light bulbs that Americans routinely used. (In 2014, two years after we returned, federal rules initiated under the Bush Administration finally caught up with those in China and elsewhere to phase out sales of the most inefficient incandescents, which consume substantially more energy than compact fluorescent and LED alternatives—though it did so over substantial public outcry.[272])

Similarly, almost nobody in China uses an electric clothes dryer, among the most notorious energy hogs in the American household.[273] It is possible that this may change as 1.4 billion Chinese get richer and more interested in exotic appliances[274]—but Japan has a fully developed economy, and line-drying remains the norm there as well.[275] One report notes that even as affluent Chinese embrace many lavish accouterments of the Western lifestyle, including cars, large-screen televisions, and double-door refrigerators, they continue to eschew the electric clothes dryer.[276] The average Chinese diet also includes far more vegetables than meat, and far less carbon-intensive beef than the standard

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[270] McKibben, *supra* note 190 (discussing the solar-thermal tubes that blanket Chinese rooftops and estimating that one company has erected over 160 million square feet of solar water heaters in China).

[271] *Id.* (comparing Chinese and American use of solar heaters).

[272] *See e.g.*, Patrick J. Kiger, *U.S. Phase-Out of Incandescent Light Bulbs Continues in 2014 with 40-, 60-Watt Varieties*, NAT'L GEOGRAPHIC MAG. (Dec. 31, 2013), http://energyblog.nationalgeographic.com/2013/12/31/u-s-phase-out-of-incandescent-light-bulbs-continues-in-2014-with-40-60-watt-varieties/.

[273] Chen Weihau, *Dry Clothes in the Open, It's Green*, CHINA DAILY (May 9, 2009), http://www.chinadaily.com.cn/opinion/2009-05/09/content_7760159.htm (praising air drying in the face of calls to modernize this "uncivilized behavior"); *Which Home Appliances Use the Most Energy?*, WISEGEEK, http://www.wisegeek.com/which-home-appliances-use-the-most-energy.htm (last visited Nov. 21, 2016) (naming clothes dryers as among the most energy-consumptive appliances).

[274] *See* Chen, *supra* note 273 (noting pressure from civil leaders to adopt electric dryers in Shanghai).

[275] *See, e.g.*, Daniella Svoboda Schmidt, *Don't Knock It 'Til You (Line) Dry It!*, INST. FOR HUMANE EDUC. (May 7, 2012), http://humaneeducation.org/blog/2012/05/07/dont-knock-it-til-you-line-dry-it/ (describing the frequent practice of line-drying in Japan).

[276] Keith B. Richburg, *Clothes Dryers Given Tepid Welcome in China*, WASH. POST (Sept. 3, 2010), http://www.washingtonpost.com/wp-dyn/content/article/2010/09/03/AR2010090302689.html

American diet.[277]

The government has helped by developing excellent infrastructure for public transport. In most Chinese cities, city public transportation is exceptional—cheap, easy to use, and everywhere. We could take the bus virtually anywhere in Qingdao for the equivalent of fifteen to thirty American cents, day or night, and usually without a long wait (although often without a seat). While automobiles are increasing in number, Chinese cities continue to invest in public transportation nationwide, and public transport is still more widely used in China than the U.S. by orders of magnitude.[278] When I returned to Qingdao in 2016, the city had constructed a new subway system and was near completion on a light rail system to bridge even remote areas to the already impressive transportation system. Where we couldn't use public transport, we used taxis—and many Chinese taxi fleets already run exclusively on natural gas.[279] Even as my family griped about the air quality around us, we nevertheless took every opportunity to be hopeful about the future, and reminded one another that it's always darkest before the dawn.

Indeed, as the winter of 2011 finally thawed into spring, we counted down the days until the heat would finally be turned off. What had seemed unendurable in the early months of winter eventually became routine, such that the days we once barricaded ourselves inside the apartment became bad days that I would (if reluctantly) take my son outside to play. We would say things like, "The air is bad today, but at least the chalk dust doesn't have too much chemical in it." For better or worse, we adjusted to our new environment—fully appreciating that it was still better than what people enjoyed in even more polluted parts of China.

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[277] Damian Carrington, *Giving Up Beef Will Reduce Carbon Footprint More Than Cars, Says Expert*, GUARDIAN (July 21, 2014), https://www.theguardian.com/environment/2014/jul/21/giving-up-beef-reduce-carbon-footprint-more-than-cars. *But see* Oliver Milman & Stuart Leavenworth, *China's Plan to Cut Meat Consumption by 50% Cheered by Climate Campaigners*, GUARDIAN (June 20, 2016), https://www.theguardian.com/world/2016/jun/20/chinas-meat-consumption-climate-change (describing the increasing prevalence of meat in the Chinese diet, and government policies designed to limit the trend).

[278] *Compare* Zhong-Ren Peng, *Urban Transportation Strategies in Chinese Cities and Their Impacts on the Urban Poor*, WILSON CTR. (June 16, 2004), https://www.wilsoncenter.org/sites/default/files/Edit6Peng_Delhi.doc (noting that the vast majority of travelers, particularly the urban poor, depend on public transportation), *with Why Don't Americans Ride Trains?*, ECONOMIST (Aug. 30, 2013), https://www.economist.com/blogs/economist-explains/2013/08/economist-explains-18 (noting that America lags behind in public transportation ridership on trains, even though it has the largest rail network in the world, with twice as much track as China). *See also* CC Huang & Hallie Kennan, *Eight Ways China Is 'Winning' on Transportation*, MEDIUM (July 14, 2016), https://medium.com/@UrbanResilience/8-ways-china-is-winning-on-transportation-1032687006a9 ("As Donald Trump likes to say, "China is beating us on everything." While that's a debatable proposition, there is one area where China is far ahead of the United States, and that's in resilient transportation systems.").

[279] *See, e.g.*, Jack Perkowski, *Natural Gas Vehicles in China*, FORBES (Apr. 13, 2012), http://www.forbes.com/sites/jackperkowski/2012/04/13/natural-gas-vehicles-in-china/ (reporting that 50% of the nation's 1.1 million taxis run on natural gas).

On November 15th, after the heat first went on, I had alternated between horrified, angry, and desperate that I had submerged my family in the very sort of environment that I had pledged my professional career to avoid. By April 15th, when the heat finally went off, I still had these feelings at times, but the desperation had mostly given way to determination. What environmentalists do is important. What environmental scientists and lawyers do is important. What environmental law professors do is important. And as I urged my colleagues that spring, there has never been a more important moment to keep doing it.

VI. FOOD CONTAMINATION, PRODUCT SAFETY, AND PUBLIC HEALTH

While preparing for our year in China, we wondered what we should bring with us from the United States. Our American friends joked that given how many of the things we rely on in the United States are actually made in China, we probably didn't have to bring anything! This made some intuitive sense; whatever we needed would doubtlessly already be there, recently manufactured.

After our arrival, we were surprised to find out how mistaken that assumption was. Indeed, we discovered a curious contrast between China's role as an international and domestic producer of consumer goods. And we were distressed to learn some of the implications of this for average Chinese people. Most westerners have probably heard troubling reports about harsh working conditions in Chinese factories that produce consumer goods for export.[280] As consumers of these products and participants in that marketplace, these reports deserve our close attention. What follows, however, is about the flip side of the problem—the safety of food and other products made in China for use by Chinese consumers.

A. Made in China

Our American friends' assumption was wrong, but for a surprising reason. It's true that China produces many of the manufactured goods now sold in the U.S. and elsewhere. What's not true is that they are all available for purchase in China. As my colleagues there explained to me, China has two separate manufacturing industries—the one that produces goods for domestic consumption, and the "export processing zones," where products destined for sale outside China are produced.[281] Similar "foreign trade zones" exists in the

[280] *See NGOs Report Harsh Conditions at Chinese Factories Making Popular Electronics*, CONG.-EXEC. COMM'N ON CHINA (July 24, 2012), https://www.cecc.gov/publications/commission-analysis/ngos-report-harsh-conditions-at-chinese-factories-making-popular (discussing poor working conditions at Chinese factories that produce electronics for well-known American brands); Richard Bilton, *Apple 'Failing to Protect Chinese Factory Workers'*, BBC NEWS (Dec. 18, 2014), http://www.bbc.com/news/business-30532463 (discussing abusive labor conditions that led to 14 suicides at Apple's largest supplier in 2010).

[281] Factories in China's export processing zones are exempted from usual domestic tax and

United States, which allow certain manufacturing activities to take place outside the usual customs process.[282] In China, goods produced in the export processing zones may not be sold on the domestic Chinese market (unless they are treated as imports, and then subject to tariffs that can increase price threefold).[283] More puzzling, while Chinese exports are generally of decent quality, this is not always the case for products sold in domestic Chinese markets. If you asked our Chinese friends in 2011, they would say it is almost never so—and through our experiences that year, we began to see their point.

Once again, it's important to pause and acknowledge the relationship between this problem and the urgency of China's economic development.[284] As discussed above, its rapid transformation from the pervasive poverty of the past to its competitive economy of the present has been accompanied by severe environmental degradation—different in degree but not in kind from the costs of American industrialization a century earlier.[285] China has made tremendous progress, but hundreds of millions of rural residents are still struggling with minimal access to health care, education, and stable sources of income.[286] The inevitable generational crisis associated with unintended consequences of the One-Child Family Policy looms large on the horizon, when caring for hundreds of millions of elderly retirees will rest on a fractional number of productive workers and family members that take their place in the economy.[287] Admittedly, the architects of Chinese public policy still have quite a lot on their plate.

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tariff treatment to attract foreign investment, but only when the products are destined for export. *See generally* XIAOLAN FU & YUNING GAO, EXPORT PROCESSING ZONES IN CHINA: A SURVEY (2007), http://www.ilo.org/public/french/dialogue/download/epzchineenglish.pdf. *See also* Renaud Anjoran, *VAT Rebate for Exporters in China: How Does It Work?*, QUALITYINSPECTION.ORG (Dec. 3, 2014), https://qualityinspection.org/vat-rebate-exporters-china-work/.

[282] *US Foreign Trade Zones*, U.S. COM. SERV. (Oct. 20, 2016), https://www.export.gov/article?id=US-Foreign-Trade-Zones (explaining U.S. foreign trade zones as "domestic U.S. sites that are considered outside U.S. Customs territory and are available for activities that might otherwise be carried on overseas for customs reasons… [including] storage, repacking, inspection, exhibition, assembly, manufacturing, and other processing").

[283] *See* Anjoran, *supra* note 281; FU & GAO, *supra* at note 281.

[284] *See supra* text accompanying notes 112–122 (discussing China's economic development and the ongoing crisis of rural poverty).

[285] *Water and Air Pollution*, HISTORY.COM (2009), http://www.history.com/topics/water-and-air-pollution (discussing air pollution during the American industrial revolution and resulting efforts to regulate pollution). *See also* AP, *Air Pollution in China is Killing 4,000 People Every Day, A New Study Finds*, GUARDIAN (Aug. 13, 2015), https://www.theguardian.com/world/2015/aug/14/air-pollution-in-china-is-killing-4000-people-every-day-a-new-study-finds (noting that specific locations in the U.S. once had air pollution almost as bad, but also that air conditions are compromised are 99.9% of the entire eastern half of China, where the majority of the population lives).

[286] *See* sources cited *supra* note 118.

[287] *See supra* notes 24–35 and accompanying text (discussing the revocation of the One-Child Family Policy).

Which is all just to fairly contextualize my observations here that, in addition to better managing pollution in the face of continued economic development, China also faces an uphill challenge to better ensure the safety and quality of the products its people come into contact with each day. Indeed, product safety is like any other environmental regulation; both rely on state-enforced rules to ensure that people are not harmed by toxins or hazards, especially when the harm is of the sort that most cannot reliably identify on their own. And at least generally speaking, the quality of domestically marketed Chinese products can leave a lot to desire.[288] Announced in 2015, the government's "Made in China 2025" initiative made Western headlines for its plans to boost selected Chinese manufacturing sectors from biopharmaceuticals to telecommunications, with the goal of making China more competitive, less reliant on Western partners, and more resilient in the face of growing tensions in international trade.[289] But the plan, which calls for 70% of all materials in designated sectors to be produced domestically by the year 2025,[290] also emphasizes the importance of improving the overall quality of Chinese manufacturing.[291] Even Premier Li Keqiang publicly criticized the quality and capacity of Chinese manufacturing, castigating the industry in a state-run media broadcast in which he asked why China could not even make a good ballpoint pen.[292]

Americans may recall how this problem reached the export market in 2007, when Chinese toys sold in the U.S. were found to have been produced with lead paint.[293] Teething children, those most vulnerable to neurotoxins, risked exposure when they inevitably gummed or sucked on these toys. As the parent

[288] Scott Kennedy, *Made in China 2025*, CTR. FOR STRATEGIC & INT'L STUD. (June 1, 2015), https://www.csis.org/analysis/made-china-2025 (noting that the "quality of Chinese producers are highly uneven").

[289] Jessica Meyers, *How 'Made in China 2025' Became the Real Threat in a Trade War*, L.A. TIMES (Apr. 24, 2018), http://www.latimes.com/world/asia/la-fg-china-2025-20180424-story.html (describing the initiative, why it is important for China's continued growth, and why Western trading partners see it as a threat).

[290] *Id.*

[291] *See* Kennedy, *supra* note 288 (describing the initiative's emphasis on improving both production quality and vertical integration in the designated sectors of the domestic manufacturing economy).

[292] Rob Schmitz, *Why Can't China Make a Good Ballpoint Pen?*, MARKETPLACE (Dec. 14, 2015), http://www.marketplace.org/2015/12/10/world/why-cant-china-make-good-ballpoint-pen#.Vngkbbq1HyQ.linkedin (reporting that Premier Li Keqiang complained for a second time about the quality of China's ballpoint pens compared to foreign competitors, in calling for more high value-added manufacturing over labor-intensive manufacturing as a means of spurring economic growth). The president of a large Chinese pen company responded that China lacks the precision technology of foreign competitors and must import the rotating ball points from elsewhere, just as China imports critical components of Chinese railways, bridges, and aircrafts. *See* Ko Tin-yau, *What a Ball Pen Tells Us About China's Manufacturing Weakness*, EJINSIGHT (Jan. 22, 2016), http://www.ejinsight.com/20160121-what-ball-pen-tells-us-about-china-s-manufacturing-weakness/.

[293] *See* Lipton & Barboza, *supra* note 58; SHAPIRO, *supra* note 58 (discussing the recall of Chinese toys manufactured with lead paint).

of a new baby at the time, I carefully pulled out all of his toys that had been made in China, just in case. But now imagine the same kind of problem in China itself—not just for toys, but for every kind of product line, and with only a fraction of the government regulators available to inspect products for health and safety. You can't just pull everything out, just in case. There would be nothing left.

B. Food and Milk Scandals

The most troubling realm of questionable product safety in China involves the sale of food. The deliciousness of Chinese food cannot be denied; Chinese cuisine is widely renowned as one of China's greatest cultural contributions to the world.[294] Nevertheless, the quality of raw ingredients has become an increasingly vexing problem in China. In recent years, there has been a parade of scandals in which chemical toxins were found in local meats, vegetables, cooking oils, and other food products.[295] Other food scandals involve the sale of fake rice made out of plastic pellets, imitation eggs made from gelatin, and the sale of unconscionably expired meat products.[296] For example, in 2015, Chinese authorities seized 100,000 tons of smuggled frozen meat for distribution throughout the country, some of which had been frozen since the 1970s (but thawed out and refrozen multiple times during transport).[297] A recent poll indicates that more than a third of Chinese people believe that food safety is a very serious problem.[298]

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[294] *See, e.g.*, Zoe Li, *Which Country Has the Best Food?* CNN TRAVEL (Feb. 27, 2018), https://www.cnn.com/travel/article/world-best-food-cultures/index.html (ranking China as the second-best food culture in the world, after Italy).

[295] *See* Boris Cambreleng, *China's Toxic Overload*, TAIPEI TIMES (June 5, 2012), http://www.taipeitimes.com/News/editorials/archives/2012/06/05/2003534536 (discussing how food scandals involving milk, meat, tofu, and cooking oil are contributing, together with air and water pollution, both to health problems and social instability); *Toxic Vegetables Expose Hidden Practices, Loopholes*, XINHUANET (May 7, 2012), https://web.archive.org/web/20141003184248/http://news.xinhuanet.com/english/china/2012-05/07/c_131573079.htm (discussing the use of formaldehyde, a known carcinogen, as a preservative for cabbage, seafood and mushrooms to extend sales).

[296] Celia Hatton, *Will China's New Food Safety Rules Work?*, BBC NEWS (Sept. 30, 2015), http://www.bbc.com/news/blogs-china-blog-34398412 (reporting on fake rice made of plastic pellets, imitation eggs made out of gelatine, and decades-old frozen meat destined for market).

[297] *Chinese Authorities Seize More than 10,000 Tons of 40-Year-Old Frozen Meat*, FOOD SAFETY NEWS (June 25, 2015), http://www.foodsafetynews.com/2015/06/chinese-authorities-seize-tons-of-40-year-old-frozen-meat/#.V8ClUE0rJD8 (describing its transport in unrefrigerated vehicles); He Na, *Fourteen Gangs Busted for Smuggling Frozen Meat*, CHINA DAILY (June 24, 2015), http://www.chinadaily.com.cn/china/2015-06/24/content_21085070.htm (valuing the 100,000 tons of smuggled chicken wings, pork, and beef at 3 billion yuan, or $483 million).

[298] Hatton, *supra* note 296 (noting that concerns over food safety have tripled in China since the milk crisis of 2008, and that a third of Chinese believe food safety issues are a 'very big problem'"); Richard Wike, *What Chinese Are Worried About*, PEW RES. CTR. (Mar. 13, 2013), http://www.pewglobal.org/2013/03/13/what-chinese-are-worried-about/ (noting that Chinese

In the parade of recent food scandals, the most notorious was the milk scandal of 2008, in which six Chinese babies died and 300,000 others were sickened by milk products that had been purposefully contaminated with melamine, an industrial chemical that raises the apparent protein content of watered-down dairy products.[299] It also causes kidney failure.[300] Manufacturing executives responsible for the contamination were fired, jailed, and even executed[301]—but two years later, it was discovered that 170 tons of the very contaminated formula that was supposed to have been destroyed after the 2008 scandal has simply been repackaged and resold on the domestic market.[302]

I knew many Chinese parents who would only give their child imported milk, even though it was the most expensive item in the family budget by far—in absolute terms, 400-500% more expensive than the average milk sold in the U.S.[303] (and this purchased by families with a fraction of the average U.S. income). These frightened parents would carefully scan UHT milk products to make sure that the only Chinese characters appear on stick-on labels—not the original cartons—ensuring that no part of the production process took place in China. We were taught to do the same on our arrival in 2011, and imported milk soon became the most expensive part of our family budget as well. I encountered the same buying habits among parents who could afford it in 2016, suggesting that little had changed, at least in terms of public anxiety.

Baby formula price differences are even more exaggerated. A single can of imported formula can cost as much as a week's worth of groceries, which is obviously prohibitive for most Chinese families.[304] Yet in 2012, just as I was writing about this very issue for the Environmental Law Professors blog, new reports confirmed the exact fears of Chinese parents that lead them to make such sacrifices for foreign-produced baby formula.

That summer, the China Daily reported that formula produced by one of China's biggest dairy manufacturers was being pulled from shelves after testing

seriously worried about food safety more than tripled from 12% in 2008 to 41% in 2013).

[299] *China Executes Two Over Tainted Milk Powder Scandal*, BBC NEWS (Nov. 24, 2009), http://news.bbc.co.uk/2/hi/asia-pacific/8375638.stm (describing the scandal); *See also Timeline: China Milk Scandal*, BBC NEWS (Jan. 25, 2010), http://news.bbc.co.uk/2/hi/asia-pacific/7720404.stm.

[300] *China Executes Two Over Tainted Milk Powder Scandal*, *supra* note 299.

[301] *Timeline: China Milk Scandal*, *supra* note 299.

[302] *China Searches for 100 Tonnes of Melamine-Tainted Milk*, BBC NEWS (Feb. 8, 2010), http://news.bbc.co.uk/2/hi/asia-pacific/8503576.stm (noting that while the powder should have been destroyed after the 2008 scandal, it "had been given to the dairy by another company as debt payment.").

[303] *Foreign Baby Formula Too Expensive for Chinese Parents*, CCTV (July 5, 2012), http://english.cntv.cn/program/china24/20120705/105499.shtml (noting that parents buying foreign brand baby formula are paying three times more than their counterparts in other countries); *Imported Milk to See Higher Prices in China*, XINHUANET (June 25, 2012), https://web.archive.org/web/20160123033503/http://news.xinhuanet.com/english/china/2012-06/25/c_131673960.htm.

[304] *Foreign Baby Formula Too Expensive for Chinese Parents*, *supra* note 303.

positive for elevated mercury levels.[305] The Yili Industrial Group recalled three series produced between November and May after inspectors discovered high mercury levels, presumed the result of air, water, and soil pollution from coal-fired power plants and industrial and mining projects.[306] Afterward, the government made an emergency announcement that it had tested 715 samples from all infant milk powders on the market, and none showed abnormal mercury content except Yili's.[307] But note the use of the word "abnormal" rather than "illegal." Perhaps the most chilling aspect of the story was that, at least at the time, China didn't actually have an official safety standard for mercury in milk powder.[308] In 2014, responding to public outrage over this issue, the government would eventually correct this regulatory oversight.[309]

I happened to be writing about this new milk scandal on July 4th, 2012, a date of no consequence in China, but one that inspired me to pause and reflect on the many things for which I am grateful in my own country. And even with all its many flaws, I was never more grateful for the U.S. Food and Drug Administration than I was right at that moment, living there in China. Indeed, my family regularly remarked on the palpable homesickness we felt for the regulatory oversight that most Americans take for granted (even as they bemoan government regulations). As our trust in the safety of our environment continued to wane, we longed for the protection we were used to in circumstances where we were ill-equipped to protect ourselves, especially food and pharmaceutical safety.

Ironically, for all the chest-thumping in some American circles about the perils of socialism, China was a Tea Partier's dream—as far away from the Nanny State as most Americans would ever wish to venture.[310] In an essay that

[305] *Baby Formula Pulled Off Shelves After Mercury Tests*, CHINA DAILY (June 15, 2012), http://www.chinadaily.com.cn/china/2012-06/15/content_15503961.htm.

[306] *Id.* (noting that environmental mercury poisoning comes from nearby industrial and mining activity). *See also* sources cited *supra* notes 60, 248–249, discussing environmental mercury in China.

[307] *Baby Formula Pulled Off Shelves After Mercury Tests*, *supra* note 305.

[308] *Id.*

[309] In 2014, the Chinese government did institute a maximum mercury level of 0.01 mg/kg for milk and milk products. MINISTRY OF HEALTH OF CHINA, NATIONAL FOOD SAFETY STANDARD: MAXIMUM LEVELS OF CONTAMINANTS IN FOOD 5 (2012), http://www.seafish.org/media/publications/China_Max_levels_of_contaminants_in_food.pdf (defining the maximum levels of lead, cadmium, mercury, arsenic, tin, nickel, chromium, nitrate, nitrite, benzapyrene, N-nitrosamines, polychlorinated biphenyls, and 3-chloro-1,2 propanediol in foods); JENNIFER CLEVER & MA JIE, CHINA'S MAXIMUM LEVELS FOR CONTAMINANTS IN FOODS 7–8 (2014), http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Maximum%20Levels%20of%20Contaminants%20in%20Foods%20_Beijing_China%20-%20Peoples%20Republic%20of_12-11-2014.pdf (reporting on China's National Food Safety Standard of Maximum Levels of Contaminants in Foods, effective on June 1, 2014).

[310] *Cf. Nanny-State America Is Regulating Its Economy to Death*, ECONOMIST (Feb. 26, 2012), http://www.businessinsider.com/nanny-state-america-is-regulating-its-economy-to-death-2012-2 (lamenting red-tape regulation in the U.S.).

spring, I urged American skeptics to consider those aspects of the Nanny State that have enabled us to live without constant fear that food and products in the marketplace will poison our children.[311] Related to my earlier invitation for regulatory skeptics to spend some quality time in China, I called these exhortations "a post-it to all my fellow-citizens who have come to take our own regulatory state so for granted that they have forgotten what life would actually look like without it."[312]

All that said, Americans should know that people in other countries see us in a similar light, as consumers of an unimaginably toxic food culture by both historical and international standards.[313] For example, as reported below in Part X, visiting Chinese researcher Sophie Shi warns that Americans may be too trusting of our own governmental oversight.[314] She observes that we regularly tolerate levels of chemical, genetic, and hormonal modification of American food products that the U.S. Food and Drug Administration ("FDA") has approved but that she and her family in China would never eat if they could avoid it.[315] Those Americans who diligently buy only organic products and avoid genetically modified ("GM") produce may feel safe, but many Americans cannot afford the luxury of those choices, and still others are unaware of the potential dangers.[316]

Back in the United States, my own family enjoys the economic privilege of choosing organic milk and produce, and we make an effort to do so. But even we accept genetically modified corn products without much protest—especially because, at least until Congress passed a GMO labeling bill in 2016, American laws did not require disclosure of GM ingredients.[317] I draw comfort in the

311 Erin Ryan, *Chinese Environmental Experiences # 5: Milk, Pesticides, and Product Safety*, ENVTL. L. PROF. BLOG (July 5, 2012), http://lawprofessors.typepad.com/environmental_law/2012/07/china-environmental-experiences-5-milk-pesticides-and-product-safety.html. *But see infra* Part X, in which Sophie Shi shares the parallel food safety concerns that she experienced while living in the United States.

312 *See* Ryan, *supra* note 311.

313 Ty Bollinger, *Does America Have the World's Worst Food Quality & Safety*, TRUTH ABOUT CANCER, https://thetruthaboutcancer.com/america-worst-food-quality-safety/ (last visited Jan. 17, 2017) (noting "a slew of chemicals in the U.S. food supply… so noxious that other countries have outright banned them."); Joseph Mercola, *Ten American Foods that Are Banned in Other Countries*, EAT LOCAL GROWN, http://eatlocalgrown.com/article/11944-banned-foods.html (last visited Mar. 20, 2018) ("Americans are slowly waking up to the sad fact that much of the food sold in the US is far inferior to the same foods sold in other nations. In fact, many of the foods you eat are banned in other countries.").

314 *See infra* Part X.

315 *Id.*

316 Elise Golan et al., *Can Low-Income Americans Afford a Healthy Diet?*, U.S. DEP'T AGRIC. ECON. RES. SERV. (Nov. 1, 2008), http://www.ers.usda.gov/amber-waves/2008/november/can-low-income-americans-afford-a-healthy-diet/ (noting that the difference between low-income households' food choices and those of other households "raises concerns about the affordability of healthy foods").

317 Stephanie Strom, *G.M.O. Labeling Bill Gains House Approval*, N.Y. TIMES (July 14, 2016),

scientific consensus of the World Health Organization, the American Medical Association, and the National Academy of Sciences that available genetically modified foods do not pose a cognizable health risk to most consumers (and certainly nothing on the order of melamine),[318] but many Americans will never research the matter as closely as that. Most will simply conclude that if it's being legally sold in the marketplace, then it's probably safe enough to eat.

Shi may be right that Americans are too trusting of the FDA. The fate of our food choices does vacillate with government decisions about what is and what is not acceptable—as demonstrated by recent regulatory efforts to remove artificial trans fats from processed foods, after their years of prevalence on the American market.[319] She is right that, by and large, we place a lot of faith in the regulatory process. For the most part, however, that faith has been rewarded. There has been no American analog to the Chinese Milk Scandal (at least not in my lifetime).[320] Americans can take pride in the fact that there has been a government agency tasked with food safety since at least 1862, when the Department of Agriculture began analyzing food preservatives and chemical additives.[321] We should be especially mindful of our ability to impact regulatory decisions through available channels of public participation, from voting to public notice and comment—as the successes of the GMO labeling bill and trans

http://www.nytimes.com/2016/07/15/business/gmo-labeling-bill-gains-house-approval.html.

[318] The WHO has concluded that, "GM foods currently available on the international market have passed safety assessments and are not likely to present risks for human health. In addition, no effects on human health have been shown as a result of the consumption of such foods [by people living in countries where approved]." *Frequently Asked Questions on Genetically Modified Foods*, WORLD HEALTH ORG. (May 2014), http://www.who.int/foodsafety/areas_work/food-technology/faq-genetically-modified-food/en/. The American Medical Association has reached a similar determination, while supporting mandatory labeling to alert consumers that may suffer from unusual sensitivities. AM. MED. ASS'N, LABELING OF BIOENGINEERED FOODS (RESOLUTIONS 508-A-11 AND 509-A-11) 253 (2012), https://www.ama-assn.org/sites/default/files/media-browser/public/hod/a12-csaph-reports_0.pdf. The National Academy of Sciences has come to a similar conclusion. *See* NAT'L ACAD. OF SCIS., SAFETY OF GENETICALLY ENGINEERED FOODS: APPROACHES TO ASSESSING UNINTENDED HEALTH AFFECTS (2004), http://www.nap.edu/read/10977/chapter/2.

[319] *See The FDA Takes Step to Remove Artificial Trans Fats in Processed Foods*, U.S. FOOD & DRUG ADMIN. (June 16, 2015), https://web.archive.org/web/20180126103145/http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm451237.htm (noting that in 2015, FDA gave food manufacturers three years to remove from their products all partially hydrogenated oils, a primary dietary source of artificial trans fats in processed foods); Kelly D. Brownell & Jennifer L. Pomeranz, *The Trans-Fat Ban—Food Regulation and Long-Term Health*, NEW ENG. J. MED. (May 8, 2014), http://www.nejm.org/doi/full/10.1056/NEJMp1314072#t=article (discussing the need for regulating partially hydrogenated oils and restricting artificial trans fats in U.S. foods).

[320] *But see* UPTON SINCLAIR, THE JUNGLE (1906) (reporting on unsanitary practices in the U.S. meat industry at the turn of the twentieth century).

[321] Wallace F. Janssen, *The Story of the Laws Behind the Labels*, U.S. FOOD & DRUG ADMIN. CONSUMER MAG. (June 1981), https://www.fda.gov/downloads/AboutFDA/WhatWeDo/History/FOrgsHistory/EvolvingPowers/UCM593437.pdf (noting that the FDA was initially created by the Department of Agriculture as a laboratory to analyze food samples).

fat ban both attest.[322] There are food safety recalls on a daily basis,[323] which provides evidence both that food safety concerns are not unfounded, but also that the regulatory process is working.

Today, the Chinese are working toward a similar model, but there have been bumps in the road. China has a parallel government agency tasked with food safety, roughly modeled after the FDA. But in 2007, agency head Zheng Xiaoyu was summarily executed for taking corporate bribes to license medicines for safety without requiring them to undergo legally required assessments.[324] The death sentence was harsh, but it reflects the urgency of China's regulatory oversight problem, and the government's effort to shift the entrenched incentives toward corruption in food and drug oversight that have allowed the problem to fester.[325] Afterward, the government announced an emergency review of nearly 170,000 medicines and medical devices that had been licensed during the prior seven years that he had led the agency.[326]

Perhaps this helps explain why, when we could bring so little with us to China, we made sure that one suitcase was filled with every imaginable medicine that we thought we might need, for uses ranging from the typical toddler's to the typical grandmother's, and everything in between. We brought ample cold and stomach medicines, knowing we would need them both frequently (and we did). We brought some antibiotics and other prescriptions that our doctors advised us to have on hand, because we had been warned to avoid gambling on Chinese pharmacies after Zheng's Xiaoyu's unfortunate reign. We also brought personal care items that seemed vulnerable, like face cream, vitamins, and tampons. In 2007, Chinese-made toothpaste was found to contain a poison used in antifreeze,[327] so we brought an entire year's worth of toothpaste and rationed it out carefully.

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322 Joshua Krause, *The FDA Has Finally Banned Trans Fats*, READY NUTRITION (June 17, 2015), http://readynutrition.com/resources/the-fda-has-finally-banned-trans-fats_17062015/ (discussing how the FDA caught up with public outcry over trans-fat harms).

323 *2018 Recalls, Market Withdrawals & Safety Alerts*, U.S. FOOD & DRUG ADMIN., https://www.fda.gov/Safety/Recalls/ArchiveRecalls/2018/default.htm (last updated May 16, 2018) (listing food safety recalls in 2018, including fifteen separate recalls in the one week period between April 13-20, 2018).

324 *China Food Safety Head Executed*, BBC NEWS (July 10, 2007, 10:36 PM), http://news.bbc.co.uk/2/hi/asia-pacific/6286698.stm (discussing Zheng's execution).

325 *Id.*

326 *Id.*

327 Walt Bogdanich, *Toxic Toothpaste Made in China Is Found in U.S.*, N.Y. TIMES (June 2, 2007), http://www.nytimes.com/2007/06/02/us/02toothpaste.html?mtrref=www.google.com&gwh=C2F284B086A7FD2EB15816C8683FAB54&gwt=pay (advising consumers to discard toothpaste made in China after federal health officials found some contained a poison used in antifreeze); *FDA Advises Consumers to Avoid Toothpaste from China Containing Harmful Chemical*, U.S. FOOD & DRUG ADMIN. (June 1, 2007), https://web.archive.org/web/20161111132957/http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2007/ucm108927.htm (warning that Chinese toothpaste could contain poisonous diethylene glycol).

The good news is that the situation began to shift in the year after we left. In 2013, the government rebranded the China Food and Drug Administration and elevated it to a cabinet level ministry,[328] signaling the perceived urgency of more effective food and drug oversight. Then in April of 2015, the new agency promulgated an ambitious Food Safety Law, which went into effect just six months later.[329] The new law sets stricter safety standards, process and production controls, labeling requirements, and required inspections.[330] Baby formula receives special treatment under the law, as do genetically modified foods, which must be reported on food labels.[331] It also provides for increased penalties for violators over previous laws, including punitive damages.[332] The new law reflects the government's seriousness about reversing the abusive market practices that have eroded public faith in the marketplace and government's ability to protect the public. It establishes exacting compliance obligations throughout the chain of production, literally from farm to table.[333]

China deserves praise for acting decisively with this new law, and there is reason to believe that it will begin to shift food production norms in the right direction. Nevertheless, many Chinese consumers and food safety experts remain skeptical that it will produce the desired results in the desired time frame. After all, the same enforcement problems that have bedeviled environmental law, the national anti-corruption campaign, and other regulatory reforms are likely to complicate enforcement of the Food Safety Law. Food commentator Yao Bo told the BBC, "China is a huge country with a large number of farmers, so enforcement will be hard. Following the food chain from start to end is nearly impossible."[334]

In the end, legal enforcement in China is like any other game of cat and mouse—except that in China, there are only a few cats, and 1.4 billion mice. A Chinese professor once explained to me why he was not more optimistic about these new regulatory reform efforts. He told me that the government will make dramatic examples of violators when they are caught—for example, executing the corrupt head of the old food safety agency, or those most culpable for the 2008 Milk Scandal—but that still will be insufficient to deter the ten thousand violators waiting in the shadows. Each one understands that the chances of being

328 Dan Stanton, *China's FDA: New Name, New Ministerial Level*, IN-PHARMA TECHNOLOGIST (Mar. 28, 2013), https://www.in-pharmatechnologist.com/Article/2013/03/28/China-s-FDA-New-Name-New-Ministerial-Level.

329 *China's Food Safety Law (2015)*, U.S. DEP'T AGRIC. FOREIGN AGRIC. SERV. (May 18, 2015), https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Amended%20Food%20Safety%20Law%20of%20China_Beijing_China%20-%20Peoples%20Republic%20of_5-18-2015.pdf.

330 *Id.*

331 *Id.*

332 *Id.*

333 *Id.*

334 Hatton, *supra* note 296.

caught are one in ten thousand. The odds against enforcement are in their favor. And with a market of 1.4 billion mice, the margins of profitability are worth the gamble.

C. Regulating for Public Health and Safety

As in the environmental realm, China's health and safety regulations are struggling to catch up with the herculean pace of its industrial sector. The gap between them is exposed by tragic examples in which local people are hurt by the very products they are racing to produce, ever more quickly and inexpensively.[335] The United States has been here before too,[336] and perhaps it is an unavoidable, if undesirable, step in the process of economic development. Yet China has reached the stage where its people are concluding that the health and safety of their children is just as important as other aspects of their economic development.[337]

The bottom line is that too little of what reaches the Chinese consumer is subject to reliable health and safety inspection based on sensible regulatory standards. Various consumer protection laws, agricultural and pharmaceutical laws, and the new food safety law discussed above set safety standards,[338] but none of these had made a cognizable dent during our year there. In 2014, two

[335] We were exposed to many examples while living in China, but they are hard to find documented in English language sources. Nevertheless, the Chinese preference for foreign brands, which are considered safer and of higher quality, is widely documented. *See, e.g.*, *The Mystery of the Chinese Consumer*, ECONOMIST (July 7, 2011), https://www.economist.com/node/18928514 ("For now, Western firms enjoy a lucrative reputation for quality and safety. Lead pollution from local tinfoil-making workshops in Zhejiang province recently injured 103 children and scores of adults. Chinese consumers are as averse as anyone else to being poisoned, so such incidents persuade many to buy Western brands. But domestic companies can make things much more cheaply, and their quality is improving.").

[336] For example, dozens of American children died after climbing into refrigerators and suffocating when the doors, prompting consumer protection legislation and eventually, the U.S. Consumer Product Safety Commission. *See Consumer Product Safety Commission*, ALLGOV, http://www.allgov.com/departments/independent-agencies/consumer-product-safety-commission?agencyid=7295 (describing the history of consumer product safety issues and legislation that ultimately led to the establishment of the U.S. Consumer Product Safety Commission). *See also About CPSP*, U.S. CONSUMER PRODUCT SAFETY COMMISSION, https://www.cpsc.gov/About-CPSC/ (discussing the agency mandate).

[337] *Cf. Product Safety of Consumer Goods in China—A Brief Introduction into China's Compliance of Toys*, EUSME CTR. (July 5, 2017), http://www.eusmecentre.org.cn/article/product-safety-consumer-goods-china-—-brief-introduction-china's-compliance-toys (noting that "Chinese consumers are getting more sophisticated and have higher expectations regarding the safety of products" and that "Chinese consumers expect imported and foreign branded products to fully comply not only with Chinese regulations but also with overseas standards").

[338] Barbara Li, *Overview of China's Product Safety Regime*, CHINA BUS. REV. (Jan. 1, 2010), http://www.chinabusinessreview.com/overview-of-chinas-product-safety-regime/. For example, China promulgated an improved Consumer Protection Law in 2014. *See China Introduces New Consumer Protection Law*, CHINA BRIEFING (Apr. 8, 2014), http://www.china-briefing.com/news/2014/04/08/china-introduces-new-consumer-protection-law.html.

years after we left, it was reported that a product safety law might be in the works,[339] but as of early 2018, it has yet to materialize. In the meanwhile, safety problems with goods produced in China are widely recognized. And yet we know that Chinese producers can do better, because for the most part, they meet exacting foreign health and safety standards when making goods for export.[340]

The gap between export and domestic products warrants attention, because as critical as milk and medicines are to public safety, they are really just the tip of the iceberg of consumer frustration with locally produced goods. Chinese of means are willing to pay extraordinary amounts for all kinds of foreign products—not just food, but also clothing and electronics—even those "foreign" products that are originally produced in China, but for export![341] This puzzled me at first, until I had lived in China long enough to witness just how often the things I bought at the local market would break, tear, or otherwise self-destruct. From clocks to toothbrushes to Ziploc-style plastic bags—it pains me to say it, but most of the Chinese goods that we purchased there just didn't work very well, or very long. Even as I wrote about this on that Fourth of July in China,[342] I found myself sweeping away from my son's mouth the disintegrating faux-leather surface of our living room couch, which had been relatively new when we moved into our apartment the previous summer. (And worrying anxiously about what toxic chemicals might have been in it.) The "Made in China 2025" goal of improving production "quality over quantity" shows that the government sees a version of this issue as a national priority, at least in the designated manufacturing sectors that currently rely on precision Western components.[343]

Indeed, the issue seems deeply related to the international trade disputes that are a constant source of irritation in Sino-American relations. The Chinese government imposes high tariffs on imports to protect domestic consumer products, a source of international tension with economic competitors like the United States.[344] Products manufactured in China (often by foreign investors)

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[339] *Chinese Product Safety Law in the 'Pipeline'?*, NEMKO (Dec. 22, 2014), https://www.nemko.com/news/chinese-product-safety-law-%E2%80%98pipeline%E2%80%99.

[340] *CPSC's Work with China*, U.S. CONSUMER PROD. SAFETY COMM'N, http://www.cpsc.gov/en/Business--Manufacturing/International/International-Regions/CPSCs-Program-Plan---China/ (last visited Jan. 17, 2017). *But see* Laurie Burkitt, *Beijing Plans to Boost Product-Safety Rules*, WALL STREET J. (Oct. 27, 2010, 12:01 AM), http://www.wsj.com/articles/SB10001424052702303891804575576272885290234 (observing that problems persist).

[341] *See The Mystery of the Chinese Consumer*, *supra* note 335 (discussing Chinese consumer preferences for foreign brands).

[342] *See supra* text between notes 309–310.

[343] *See* Kennedy, *supra* note 288, and accompanying text. In turn, Western manufacturers see the initiative as a threat to their intellectual property and international market share. *See* Meyers, *supra* note 289.

[344] *See, e.g.*, Alan Beattie, *WTO Bans Chinese Tariffs on US Steel*, FIN. TIMES (Oct. 18, 2012), http://www.ft.com/intl/cms/s/0/82d63fb0-193c-11e2-9b3e-00144feabdc0.html#axzz2BIyZziQA; Jim Puzzanghera & Michael A. Memoli, *U.S., China File Dueling Complaints as Trade Tensions Heat Up*, L.A. TIMES (Sept. 18, 2012), http://articles.latimes.com/2012/sep/18/business/la-fi-obama-china-

are exempted from these tariffs when destined for foreign markets, and the foreign investment in those factories has contributed to China's rapid economic development. However, like foreign imports, the products from Chinese export processing zones also cannot be sold domestically, presumably for the same reason—so that they will not complete with the true domestic manufacturing sector.[345] China's burgeoning domestic industry is thus shielded from real competition, which provokes the ire of trading partners that import a lot from China.[346] While living in China, we often mused about the relationship between protectionist trade policies and the poor quality of domestic goods. After all, if local manufacturers don't have to compete with products that don't self-destruct, there's that much less incentive to make things that won't, themselves, self-destruct.

That said, it's obvious why the Chinese government would favor protectionist trade policies—and honestly, if you were the Chinese government, you would probably would too. It's not just about enhancing resilience during a potential trade war. China understands that its continued economic prosperity hinges on being able to shift from producing exports to producing goods for its own enormous domestic market. China's best long-term economic bet is to become a consumer-spending driven economy, like the United States. Corresponding to its shift from a low to middle-income country, it will have no shortage of consumers in the foreseeable future. But if foreign-made imports were not made artificially more expensive than they already are, then Chinese consumers might prefer them to local products even more strongly than they already do. To move from a middle-income country to a high-income country, China must harness the enormous purchasing power of its emerging consumer class. So of course it wants to channel that purchasing toward domestic production.

I once had a conversation about this with a student, who was complaining about how expensive American-made clothing was in China. As he explained, import tariffs make this clothing much more expensive than it would be in the United States, even in absolute terms. For example, a pair of shoes selling for $40 in the U.S. would cost the equivalent of $150 in China. I pointed out that from the perspective of his government, these tariffs were a useful means of accelerating the developing Chinese economy—ensuring that Chinese consumers funnel their incomes back into the Chinese economy by buying only domestically produced goods. After thinking about it, he agreed that, yes—if he were a Chinese official in charge of such things, he would probably make the

20120918 (noting that each has filed trade complaints against the other, "escalating trade tensions amid a weakening global economy").

345 *See supra* notes 281–283 and accompanying text.

346 *See, e.g.*, *China's Protectionism Comes Home to Roost*, FIN. TIMES (Jan. 3, 2018), https://www.ft.com/content/14196546-f098-11e7-ac08-07c3086a2625 (discussing frustration with Chinese protectionist trade policies in the U.S. and other trading partners).

same choice. But as a Chinese consumer, all he really wanted were some better quality shoes.

People in the developing world deserve access to high-quality food and products as much as anyone else. Ideally, a wise combination of reasonable government regulations and competitive market forces should provide the Chinese people with progressively better choices. But if you were a government trying to get 170 million people out of abject poverty, you might have to play a difficult game of triage with regulatory priorities. Should you require seatbelts on school buses if that means that more rural children will never make it to school? And if you could harness the vast purchasing power of your citizenry to advance rural economic development that would enable both, then wouldn't you do it, notwithstanding the ideals of free trade? (Especially when your more developed trading partners, including the United States, are growing increasingly skeptical of those heralded free trade ideals.[347])

Even beyond food and products, I observed many other ways in which regulatory regard for individual health and safety in China departed from Western norms, reflecting differences that are both economic and cultural. For example, while flying back to China after lecturing in Vietnam, I was astonished to find myself fumigated without warning by an aerosolized pesticide that a Chinese flight attendant suddenly sprayed on me in my seat. I was informed by the flight crew that this was required by Chinese law on flights from Vietnam and other parts of southeast Asia, in order to prevent the spread of insect-borne diseases.[348] That seemed like a very worthy goal—but my eyes, nose, and throat burned worryingly for the rest of the day, and I wondered how I would have felt about this had I been pregnant or carrying an infant at the time. We had already experienced harrowing efforts avoiding pesticides whose safety we could not ascertain,[349] and later that year, we felt those efforts affirmed when the Chinese government decided to ban twenty commonly used pesticides it determined were

[347] *Trade, At What Price?*, ECONOMIST (Apr. 2, 2016), http://www.economist.com/news/united-states/21695855-americas-economy-benefits-hugely-trade-its-costs-have-been-amplified-policy (discussing the growing anti-trade sentiment within the United States).

[348] According to the U.S. Department of Transportation, international law permits nations to perform disinsection to ensure that inbound airline passengers do not import insect infestations, and the WHO and International Civil Aviation Organization have stipulated that the use of aerosolized insecticides within a boarded aircraft cabin is an acceptable method. *Aircraft Disinsection Requirements*, U.S. DEP'T TRANSP., https://www.transportation.gov/airconsumer/spray (last updated June 22, 2017). A WHO report found that the practice, "if performed appropriately, would not present a risk to human health, [but] that some individuals may experience transient discomfort following aircraft disinsection by aerosol application." *Id.*; *see also* R.A. ELLIS, AIRCRAFT DISINSECTION: A GUIDE FOR MILITARY & CIVILIAN AIR CARRIERS 15 (1996), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.215.4945&rep=rep1&type=pdf (recommending disinsection due to a resurgence in malaria and yellow fever in Viet Nam).

[349] *See supra* Part II.

toxic to humans.[350]

In another example, my husband—the grandson of a lifelong Milwaukee firefighter—was dismayed that our apartment had barred-in windows and no fire escape, for which I teased him as an over-privileged westerner until I saw ordinary people exploding fireworks just feet from neighboring homes and businesses. The displays were spectacular, but at the occasional cost of fingers, lives, and some infamously devastating fires—including one that rendered Beijing's most famous modern edifice uninhabitable just as it opened to the public. In 2009, during Chinese New Year celebrations, the newly constructed headquarters of the China Central Television network—sometimes known as the "pair of pants" building for its unique shape—was burned beyond utility after fireworks at an adjacent hotel set them both ablaze.[351] The complex had won an international design competition in early 2008, but on Lantern Day in 2009, fireworks ignited the building, which so compromised its structural integrity that it remained unoccupied for repairs some three to five years afterward.[352]

Human health and safety can also fare poorly on Chinese roadways, where traffic-related mortalities are unfortunately common.[353] Most Chinese riders do not wear helmets on their motorbikes, and seat belts are purposefully dismantled in most cars because people consider them a nuisance. (In one of our more hilarious cross-cultural moments, we lugged a child car-seat all the way from the United States, knowing we'd never find one in China—only to discover that it was useless, because there were no seatbelts to secure it in place!) The "rules of the road" seem more suggestive than mandatory. Traffic lights to help pedestrians cross the street are rare, and even those that exist are of limited predictive value. As my family often joked, "Don't Walk" meant that you would

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[350] *See supra* notes 61–68 and accompanying text (discussing my family's experiences with Chinese pesticides).

[351] *See Firecrackers Blamed for Hotel Fire Near Beijing's New CCTV Headquarters, 7 Injured*, XINHUANET (Feb. 9, 2009), https://web.archive.org/web/20170323143748/http://news.xinhuanet.com/english/2009-02/09/content_10790640.htm (reporting on the fire).

[352] Some sources suggest that the building was finally ready for habitation in 2012. *CCTV Headquarters Building*, BAIDU ENCYCLOPEDIA, https://baike.baidu.com/item/中央电视台总部大楼/10019209?fr=aladdin&fromid=4823880&fromtitle=央视大楼#6 (last visited May 17, 2018) (reporting that CCTV was able to relocate to the new site on June 5, 2012). However, later reporting in 2014 notes that the building was still empty, and that earlier reports of the building's readiness were premature. Wayne Ma, *Years Later, CCTV May Finally Be Moving into Its Headquarters*, WALL STREET J. (Oct. 20, 2014, 7:04 PM), http://blogs.wsj.com/chinarealtime/2014/10/20/years-later-cctv-may-finally-be-moving-into-its-headquarters/ (noting that this might change soon, but also that "[s]ome employees say they remain skeptical of the latest plans to move, noting that move-in deadlines have been verbally announced in the past, only to be missed without explanation.").

[353] Choi Chi-yuk, *Traffic's Toll: Road Accidents Kill 700 People a Day in China*, SOUTH CHINA MORNING POST (May 24, 2016), http://www.scmp.com/news/china/society/article/1952218/traffics-toll-road-accidents-kill-700-people-day-china ("The WHO estimates that traffic accident claim about 260,000 deaths on the mainland each year, of which with 60 per cent are vulnerable road users such as pedestrians, cyclists, and motorcyclists.").

surely be killed if you cross; "Walk" meant that it was now somewhat less likely that you would be killed.

Admittedly, a lot of what I am describing may just be the reality of life in a developing country, or in any country where the industrial infrastructure that enables manufacturing, skyscrapers, airlines, and highways is still relatively new. This is probably one of those moments where, as a first-world interloper, I must be careful not to whine too much about this aspect of the experience. At all times, we remained exquisitely aware of the intense and unfair privileges that accord our good fortune at having been born in the post-industrialized world, without having to live through the growing pains of getting there. With that in mind, my purpose in sharing these observations is not so much to complain, but to help readers in the developed world appreciate the full scope of the public health and safety challenges that some of our brothers and sisters in other parts of the world navigate on a daily basis. When the regulatory triage finally allows it, these challenges may indicate next steps.

D. Public Health and Chinese Culture

Having waxed long about these daunting threats to public health in China, I now offer the important clarification that this is only part of the story—and perhaps not even the most important part. Notwithstanding incipient health and safety standards, and even considering the pollution I described above—many Chinese people are, at least on average, healthier than their American counterparts.[354]

China may have more to do in terms of public health and safety regulation, but there are many elements of Chinese culture that are much more committed to human health than Western cultures—and especially American culture. Americans have been comparatively good at regulating for public health, but our actual lifestyles don't do much to advance the goal (as documented by our famously expanding waistlines).[355] In fact, the American lifestyle may be undoing much of the benefits that regulation is accomplishing, evidenced by—for the first time in generations—declining life expectancy among dominant

[354] *See* Nicholas Kristof, *Where China Outpaces America*, N.Y. TIMES (Apr. 30, 2011), http://www.nytimes.com/2011/05/01/opinion/01kristof.html?_r=0 (noting that Shanghai residents have a longer life expectancy than Americans—82 in Shanghai compared with 79 in the U.S and acknowledging that the average life expectancy for the rest of China is lower that the U.S., at 73, but rising steadily). Meanwhile, life expectancy for certain populations in the U.S. is declining, for example, among white people. Betsy McKay, *Life Expectancy for White Americans Declines*, WALL STREET J. (Apr. 20, 2016), http://www.wsj.com/articles/life-expectancy-for-white-americans-declines-1461124861.

[355] Maggie Fox, *America's Obesity Epidemic Hits a New High*, NBC NEWS (June 7, 2016, 4:30 PM), http://www.cnbc.com/2016/06/07/americas-obesity-epidemic-hits-a-new-high.html (reporting that 38% of adults and 17% of teenagers are obese, and that efforts to encourage weight loss have had little effect).

cultural subpopulations.[356] By contrast, healthful living is an important part of Chinese culture, and among its most admirable. Most Chinese people prefer dried fruits and nuts to cheese doodles. They rest regularly and most sleep well at night. Chinese medicine emphasizes the maintenance of wellness over the post-hoc treatment of disease.

Most of all, healthy exercise is a foundation of everyday life. I don't just mean that Chinese people are in better shape because fewer of them have private cars, and thus they must frequently walk where Americans usually drive. That is also true, but it is only part of the reason. In China, exercise is a ritual part of daily life—and community life—in a way that would be wholly unfamiliar to the average American.

In the morning, people gather for morning exercise in public parks, courtyards, and parking lots, often doing tai chi. Seeing a hundred people spontaneously join in perfect, soundless unity this way is truly one of the most beautiful things I have ever seen. After dinner, families take a ritual "digestive walk" around the neighborhood together. Then begins evening exercise, when people again gather in public areas for a variety of activities. Children play openly while men play team sports. Women regularly gather for a Chinese cultural version of line-dancing, in which they collectively perform a repeating, rotating sequence to accompanying music. We were sad to discover very few playgrounds for Chinese children—but in perhaps a wiser use of scarce resources, every neighborhood has an exercise park for adults, with metal equipment to keep people fit and limber, especially as they age. They are frequently used, especially after work, by young and old alike.

This essay thus ends where it began, acknowledging the developmental differences that make my observations here admittedly fraught. Nations struggling to feed rural populations may need to be more concerned with crop yields than agricultural pesticides, or perhaps more concerned with trade independence than product quality. Chinese culture protects public health in other ways, and it is understandable that regulatory priorities have focused elsewhere to this point—although perhaps the time has come for change. But where American regulations offer models for China, Chinese culture offers lessons for Americans, in exactly those realms where we need them most.

VII. WASTE MANAGEMENT IN AN UNCLEAN WORLD

The most serious environmental challenge in China that is least recognized outside of China is the increasingly alarming problem of waste. Like China's other environmental challenges, the problem of waste management is, without exaggeration, epic.[357] Mountains of garbage are piling up around Chinese cities

[356] McKay, *supra* note 354.

[357] E. ASIA INFRASTRUCTURE DEP'T WORLD BANK, WASTE MANAGEMENT IN CHINA: ISSUES

nationwide, fouling streets, waterways, and surrounding countryside. This Part explores some unique features of China's waste management crisis, including the relationship between prior scarcity and present consumption, cultural norms around littering, and the significance of all this for wider environmental law.

A. Garbage as the New Environmental Issue

For China, already struggling with staggering air and water pollution, waste management threatens to become the next big environmental issue.[358] China finally surpassed the United States as the world's largest producer of solid waste in 2004, and it is expected to produce twice as much waste as the U.S. by 2030.[359] On a per capita basis, Americans still produce nearly twice as much solid waste as the Chinese, producing about 4.40 pounds (or 2 kg) per person per day, of which we recycle and compost a little more than a third.[360] By contrast, the average Chinese produces only 2.45 pounds (or 1.12 kg) of waste, of which little is recycled by formal methods.[361] Nevertheless, though China's per capita rate of waste production is still half that of the United States, it has been accelerating rapidly with improving economic conditions.[362] This means that as Chinese consumers get richer, they are buying more, and discarding more—basically, becoming more like Americans (heaven help us!).

As a result, Chinese landfills are bursting beyond capacity, and they are releasing dangerous pollutants from methane to mercury.[363] The management of existing landfills and the creation of new refuse sites are prompting urgent

AND RECOMMENDATIONS (2005), http://siteresources.worldbank.org/INTEAPREGTOPURBDEV/Resources/China-Waste-Management1.pdf (acknowledging the enormity of China's waste problems); Wang Qian, *Beijing Headed for 'Garbage Crisis'*, CHINA DAILY (Nov. 6, 2009, 8:43 AM), http://www.chinadaily.com.cn/china/2009-06/11/content_8270865.htm (government newspaper acknowledging the same).

358 *See, e.g.*, Wang, *supra* note 357 (discussing the urgency of the crisis). *See also* Nathan Vanderklippe, *China's Trash is Taking Over*, GLOBE & MAIL (May 11, 2015), http://www.theglobeandmail.com/news/world/chinas-trash-is-taking-over/article24367032/ (warning that Chinese are "'under siege' from a deluge of trash that grows larger every year," and noting that the garbage problem is a key obstacle to sustainable development). *See also* Hays, *supra* note 90 (describing the mounting waste).

359 *China Set to Produce Twice as Much Waste as US by 2030*, WASTE MGMT. WORLD (Jun. 14, 2012, 11:20 AM) https://waste-management-world.com/a/china-set-to-produce-twice-as-much-waste-as-us-by.

360 *Advancing Sustainable Materials Management: Facts and Figures*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/smm/advancing-sustainable-materials-management-facts-and-figures (last updated Nov. 21, 2017) (providing U.S. statistics).

361 Vanderklippe, *supra* note 358 (reporting Chinese average waste production at 1.12 kg).

362 *Id.*

363 Elizabeth M. Lynch, *Trash in China—A Pollution Problem that Could Choke the World*, CHINA L. & POL'Y (Aug. 14, 2009), http://chinalawandpolicy.com/2009/08/14/trash-in-china-%E2%80%93-a-pollution-problem-that-could-choke-the-world/ (noting that Beijing landfills are expected to reach capacity within five years).

public protests on par with those erupting over chemical manufacturing pollution.[364] Residential recycling or composting is rare, and cities generally make no effort to separate different kinds of waste at the landfill, even as they overflow.[365] Five hundred refuse sites surround Beijing alone (a collection photographer Wang Jiuliang refers to as Beijing's "Seventh Ring Road"),[366] and experts predict that most will soon exceed capacity.[367]

Urban trash collection varies widely, with daily collection in some cities and monthly collection in others—not usually from door to door, but from a designated street corner.[368] Yet in many parts of the country, there is simply no municipal trash collection at all.[369] Trash is either burned, reused, dumped elsewhere, or left to rot in ever-growing piles around individual homes and neighborhoods.[370] The government has promised to do more to incinerate trash to free up space, but burning trash creates its own problems, feeding into the air quality problems discussed above in Part VI.[371] The problem has international implications as well, as airborne mercury and dioxide pollutants traced to Chinese incinerators have made their way to the Pacific Coast of North America.[372]

Yet when it comes to the international dimensions of China's solid waste crisis, harm generally flows in the reverse direction. China's solid waste problem has been compounded by the fact that the nation has been importing

[364] *Chinese Protesters Clash with Police Over Garbage Dump*, REUTERS (Dec. 10, 2015, 3:28 AM), http://www.reuters.com/article/us-china-environment-idUSKBN0TT1A820151210 (discussing violent public protests over new landfills); Adam Minter, *China's Trash is Getting Dirtier*, BLOOMBERG (Sept. 18, 2014), https://www.bloomberg.com/view/articles/2014-09-18/china-s-trash-is-getting-dirtier (reporting on demonstrations opposing a new trash incinerator).

[365] Vanderklippe, *supra* note 358; *cf.* MARIE PLA, MUNICIPAL SOLID WASTE MANAGEMENT IN BEIJING 5 (2016), http://wiego.org/sites/wiego.org/files/resources/files/Pla-Solid-Waste-Management-China.pdf (describing the failure of efforts to introduce municipal separation in Beijing).

[366] Vanderklippe, *supra* note 358.

[367] Lynch, *supra* note 363 ("Beijing alone produces 18,400 tons of trash per day, 6.7 million tons per year, quickly filling Beijing's 23 landfills.").

[368] Hays, *supra* note 90 (describing how garbage dumped on designated Beijing street corners is carted away several times a day).

[369] *Cf.* Boya Zhou, Chunxia Sun & Hongtao Yi, *Solid Waste Disposal in Chinese Cities: An Evaluation of Local Performance*, 9 SUSTAINABILITY 2234, 2, 4, 16 (Dec. 3, 2017), http://www.mdpi.com/2071-1050/9/12/2234/pdf (discussing the state of solid waste management in China, noting that only about half of all solid waste is being formally managed, and acknowledging the lack of systematic research about nationwide adoption of solid waste management best practices recommended by the government).

[370] Trash heaps of this sort are regularly seen throughout China. *Cf. id.*, at 4 (noting that landfill and incineration are the primary formal means of solid waste disposal, but that China was using formal methods of disposal for only 52.4% of all municipal solid waste).

[371] *Id.* at 1 (noting that incineration is a primary means of disposal but that it causes other forms of environmental harm).

[372] Lynch, *supra* note 363.

refuse from the rest of the world for decades.[373] In the 1980s, China became the world's largest importer of solid waste.[374] In 2012, more than half of all globally exported plastic waste ended up in China,[375] and the United States exported 1.42 million tons of scrap plastics to China in 2016 alone.[376] While some of these imports provided valuable raw materials for China's booming manufacturing sector, the steady stream of poorly screened refuse also became a source of sobering environmental and public health harm.[377] In one chilling example, in Guiyu, a town in Guangdong province that collects imported electronic waste, an investigation revealed that nearly four out of five children had excess levels of lead in their bloodstream.[378] Tragic examples like these prompted the Chinese government to announce a ban on twenty-four categories of imported waste and recyclables in 2017.[379]

One exception to the trash crisis for which China deserves credit is its successes in recycling plastic beverage bottles, which are especially omnipresent in a world without potable water. Reports indicate that China reclaims as much as 90% of all PET (polyethylene terephthalate) bottles each year.[380] Recycling bins accompany trash bins in public places, inviting the public to participate in the effort, though mostly in vain.[381] Nevertheless, the program succeeds without mainstream participation because it is staffed by migrant workers on the poorest fringes of society, who retrieve recyclables by sorting through mountains of others' trash.[382] Homeless recycling entrepreneurs (and others) operate similarly in American cities, but most urban Americans also participate in curbside collection of non-deposit recyclables without economic sanctions or incentives. In 2015, three-quarters of all Americans had access to some form of curbside recycling, and most American children are schooled with recycling values until

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373 *See* Tom Baxter & Liu Hua, *Twenty-four Reasons Why China's Ban on Foreign Trash Is a Wake-up Call for Global Waste Exporters*, S. CHINA MORNING POST (Dec. 31, 2017), at http://www.scmp.com/comment/insight-opinion/article/2126098/24-reasons-why-chinas-ban-foreign-trash-wake-call-global.

374 *Id.*

375 *Id.*

376 Christine Cole, *China Bans Foreign Waste—but What Will Happen to the World's Recycling?*, SCI. AM. (Oct. 21, 2017), https://www.scientificamerican.com/article/china-bans-foreign-waste-but-what-will-happen-to-the-worlds-recycling/.

377 *See* Baxter & Hua, *supra* note 373.

378 *Id.*

379 *See* Cole, *supra* note 376.

380 *Cf.* Kim Kyung-Hoon, *Garbage Recycling: Chinese Style,* REUTERS (June 6, 2013), http://blogs.reuters.com/photographers-blog/2013/06/06/garbage-recycling-chinese-style/ (noting the 90% rate of plastic bottle reclamationin Beijing); *see also* Adam Minter, *How Beijing—and the Rest of China—Recycles Plastic,* SCI. AM. (Nov. 8, 2013), http://www.scientificamerican.com/article/china-recycles-plastic/ (describing the scrap plastic recycling industry).

381 Kyung-Hoon, *supra* note 380 (noting that most Chinese "have no real concept of separating trash for recycling").

382 *See id*.

they become part of their social conscience (even if they don't always follow it).[383]

By contrast, voluntary recycling has yet to become an entrenched societal norm in China—although government efforts to inculcate greater sustainability consciousness through the Circular Economy Law mark an auspicious start.[384] Given that much of the country still lacks curbside trash collection, it shouldn't be surprising that there is not yet residential recycling in China.[385] This is one of those differences between the U.S. and China that fairly reflects the two nations' different stages of economic development. An early stage of coordinated waste management is understandable in a country still grappling with extreme rural poverty, and the government deserves praise for its efforts to promote the Circular Economy alongside other development initiatives.

Given the mounting garbage crisis, however, it may be surprising that until recently, even China's wealthiest cities have lagged on separating waste at landfills, or getting their citizens to help. Beijing is China's biggest producer of household trash, reportedly collecting 8.7 million tons last year, a figure double what it had a decade earlier.[386] In 2010, the city resolved to maximize recycling by 2020, hiring an army of 20,000 "Green Armband" workers to teach residents how to sort their trash to separate recyclables from solid waste.[387] However, the program has floundered because the city has been unable to persuade residents to participate in the voluntary program.[388] Shanghai began implementing a new municipal sorting system in May of 2018, with plans for comprehensive trash sorting by 2020.[389] Meanwhile, reforms in Taiwan now mandate waste-sorting

[383] *Cf. Recycling in America: In the Bin*, ECONOMIST (Apr. 22, 2015), http://www.economist.com/blogs/democracyinamerica/2015/04/recycling-america (reporting that nearly 10,000 municipalities sponsor recycling programs, though many Americans lack proper receptacles, and one quarter lack curbside recycling options entirely).

[384] *See infra* the Circular Economy Law (Part VIII).

[385] *See, e.g.*, Roma Eisenstark, *China's Rural Dumping Grounds*, SLATE (May 29, 2015), http://www.slate.com/articles/life/caixin/2015/05/china_s_waste_management_garbage_disposal_in_the_country_s_rural_areas_is.html (reporting on trash disposal in rural China); Minter, *supra* note 380 (discussing management of trash and recycling).

[386] *Beijing Struggles to Get Residents to Declare War on Trash*, REUTERS (Apr. 7, 2017), https://www.reuters.com/article/us-china-waste-beijing/beijing-struggles-to-get-residents-to-declare-war-on-trash-idUSKBN1790QZ ("The capital, with a population of 22 million, has vowed to recycle all household waste by the end of 2020…. [but] finds it tough to raise participation.").

[387] *Id.*

[388] *Id.* ("China's garbage-strewn capital of Beijing has promised to boost spending to banish growing mountains of waste, but is struggling to persuade its upwardly-mobile residents to sort their trash.").

[389] Teng Jing Xuan & Ge Mingning, *Shanghai Talks Trash*, CAIXIN (May 18, 2018), https://www.caixinglobal.com/2018-05-18/shanghai-talks-trash-101252423.html ("The city plans to have a comprehensive domestic waste-sorting system in place by 2020, and already requires thousands of households to sort their waste into distinct bins for recyclable materials, hazardous waste, "wet" or organic waste, and "dry" waste. But residents have long complained that sanitation workers often dump different types of garbage into the same containers, wasting the effort spent on

by residents at home, which has doubled recycling and reduced garbage output by 40%.[390]

During the year we lived in China, these kinds of efforts were nascent to nonexistent. We found no recycling or trash sorting of any kind in Qingdao. Entrenched in recycling norms as I am, I was surprised that there was not even paper recycling at my beautiful and well-resourced university, especially given its nationally leading environmental program. But even more noteworthy, my environmental students seemed unfamiliar with the concept of residential recycling, as they were completely baffled by my repeated efforts to recycle household waste. Notwithstanding their substantive expertise in environmental management, their pride in China's valiant anti-desertifcation efforts to reforest North China,[391] and their comparatively sophisticated ideas about pollution control, the idea of recycling paper was an entirely foreign concept. At least so far, recycling has not been the gateway to environmental consciousness in China that it has been for many in the West.

B. Conspicuous Consumption and Extreme Scarcity

The garbage problem in China differs from the previously discussed problems of air and water pollution, which have increased as industry undertakes dirtier jobs with dirtier materials, on an ever-larger scale and with little regulation. In the case of the garbage problem, there is no new industry to blame or corrupt officials undermining regulation. In fact, to the extent there have been changes in municipal waste management, they have mostly been for better, rather than worse.[392] So where does this crisis come from? The answer is simple, of course—it's that there is just more and more trash. As Chinese consumers develop purchasing power rivaling that in the West, their lifestyles, buying habits, and personal choices regarding waste look more and more like those in the West. They buy more stuff, more of it comes with elaborate packaging, more is designed for temporary use, and more is therefore thrown away. It is the simple math of expanding consumerism that underlies the trash epidemic in China.

Yet Chinese norms around waste may be complicated by an additional, historical factor—one driven by fresh memories of poverty-driven scarcity.

sorting them. Now, sanitation workers in a few test areas have been given new collection carts that have separate compartments for different types of garbage.").

390 Vanderklippe, *supra* note 358 (contrasting mainland China with Taiwan and noting that Taipei now produces only 0.37 kilograms of per capita waste per day).

391 *See* Coco Liu, *China's Great Green Wall Helps Pull CO_2 Out of Atmosphere*, SCI. AM. (Apr. 24, 2015), https://www.scientificamerican.com/article/china-s-great-green-wall-helps-pull-co2-out-of-atmosphere/ (discussing China's Three-North Shelter Forest Program, which has planted 100,000 square miles of forest).

392 *See* Lynch, *supra* note 363 (reporting that the growing Chinese middle class is demanding the construction of neighborhood incinerators that emit fewer pollutants).

Recall that during the famines of the late 1950s and early 1960s, following the failure of collectivized agriculture under the Great Leap Forward, between 20 and 40 million people starved to death.[393] Living Chinese recall eating bark and grass to survive.[394] As a people, the Chinese collectively remember what it meant to have so little that every material object, every grain of rice, was a treasure. The accomplishment of today's prosperity—especially in the wake of such extreme deprivation—has left a mark on how middle-class Chinese live in today's world. The fact that they no longer have to count grains of rice is cause for pride and celebration. In this regard, the unrepentant consumption that fuels the garbage crisis might be viewed as a rational emotional response to the legacy of scarcity that China has only recently overcome.

Before I say more, let me openly acknowledge the hypocrisy of my observations here, because nobody has cornered the market on conspicuous consumption like the average middle-class American. Moreover, Americans are fortunate to have lived through a period in which most have not endured the conditions of scarcity regularly experienced by people in the developing world—and we all should do better to remember that. My family and I were regularly shamed by the patterns of American consumption that our Chinese friends witnessed from afar—where ever bigger cars, houses, and other forms of cultural bling are marketed to consumers who enjoy far more than their fair share of world resources. Little in the average Chinese lifestyle comes close to American gluttony, so what I am offering here is pointedly not a comparative perspective, and Americans should take equal heed of this problem.

All that said, even my equally culpable American family was perplexed by the patterns of consumption and waste that we witnessed in China—from piles of used disposables, to discarded consumer items that seemed relatively new, to the indifference toward maintaining even luxury apartment buildings against the effects of weather and time. Especially in a developing country, where resources are still comparatively scarce, why not conserve and maintain? Why not fix old things, rather than just tossing them aside for new ones?

In puzzling over this question with some environmental faculty at Wuhan University, I learned how the nation's developing status can actually push in the opposite direction. One shared a tale from decades earlier, in the pre-PowerPoint era, when he had used an overhead projector with transparencies to accompany a lecture. A filament in the ancient projector blew, and everyone waited while the university repairman was called in. Using tweezers and tiny metallic wire, the repairman resurrected the unit until it projected once again. The man was a virtual wizard, my colleague explained, he could fix anything electronic—

[393] Tania Branigan, *China's Great Famine: The True Story*, GUARDIAN (Jan. 1, 2013), https://www.theguardian.com/world/2013/jan/01/china-great-famine-book-tombstone (noting that officials admit to 20 million deaths, while others put the total at 45 million).

[394] *See* THAXTON, *supra* note 113 (discussing the famines following the Great Leap Forward).

because he had to. At the time, there was no alternative but to fix things, over and over again. But now, explained my colleague, in this age of emerging wealth, there was a degree of national pride to be had in *not* having to fix things. For some, being able to toss out the old rather than indefinitely fix and maintain it was a sign of emerging social status.

On another occasion, several students explained to me that their parents absolutely forbade them from licking their fingers when they ate—a good habit that they adhered to even at the local Kentucky Fried Chicken, a popular foreign restaurant chain in China. At first, I assumed this was a matter of good hygiene, and I regretted the manners my own child displayed (though in his defense, at a restaurant whose American slogan is "Finger Licking Good!"). But I later learned the backstory behind the prohibition. These students' parents had come of age at a time where they had sucked every last drop of grease from their fingers, because there simply was not enough food. Not a calorie could go to waste. Now, when their own children licked a tasty finger over a full plate of food, these parents would emphatically bat sticky fingers away from little mouths, proudly reminding them that they did not have to lick their fingers for nourishment. They were not to do so, but only because doing so symbolized a desperation over which the nation had triumphed (at least in these urban areas) through economic development.

This cultural memory of extreme scarcity runs deep in China, and I saw it reflected in other curious cultural differences between China and the West. One example that often confuses foreign visitors is the way that Chinese tend not to queue in lines. In contrast to Western social norms, there is not a strong Chinese tradition of waiting in line for a turn. So, for example, when the bus arrives, the crowd simply surges the door and people gradually push their way through, one by one. Something like lines form at street food stalls, but the rules are relaxed and there is no hard order to them; if someone wants it badly enough, they just insert themselves closer to the counter and they will get served first. Even at the airport, as people wait to board the plane at the gate, many will queue, but others force their way through to the front as the group moves toward the plane. Western sensibilities are sometimes jarred by this behavior, but most Chinese people tolerate it with either patience or indifference.[395] Why no tradition of lining up? This may be purely anecdotal, but one Chinese lawyer explained to me that this is another response to the nation's long history of extreme scarcity: in a world where there is never enough to go around, people long ago learned to grab for what they need. The earliest bird gets the lone worm, and even if might doesn't make it completely right, assertiveness still reaps a solid reward.

Ironically, then, the developed-world consumption patterns that are feeding

[395] I later discovered how fully I had crossed over while escorting some visiting American students through Beijing, feeling frustrated by their halting efforts to politely advance through crowds while I soared through cracks and openings like a native....

the garbage crisis in new China may actually be exacerbated by the developing-world memory of scarcity in old China, and the exultant release from that era of defining poverty. Of course, these traditions are changing as the experience and memory of scarcity wanes. Still, I occasionally wonder whether the old premise may sow intercultural confusion in international affairs, such as negotiations over the hotly contested resources in the thawing Arctic, or even the contested islands in the South China Sea.[396]

C. Waste Management and Cultural Norms

With so much accumulating garbage, uncontained trash is thus commonplace in China—heaped on the sides of buildings, strewn on the curb, littering not only streets but also mountain trails and otherwise beautiful beaches. The water pollution and consumer-product quality problems addressed in Parts III and V exacerbate the garbage crisis. Legitimate fears of unclean reusables, the growing use of pre-packaged and convenience foods, and easily breakable products all compound a growing urban culture of disposability, leading to a stream of waste that is often unceremoniously piled up around neighborhoods and even pristine outlying areas.

Qingdao is a relatively clean city in China, and we had garbage service through the university. Still, piles of trash accumulated around the neighborhood—ranging from food refuse to building materials—and loose trash was widely strewn around public and private outdoor areas. Some items were more entertaining than others, but none was especially aesthetic. A broken toilet and shards of broken glass were piled outside our building for many months, and that was only one of many such piles.

The neighborhood market street was hosed down by a street-cleaning truck

[396] To neighboring Asian countries, China is annexing disputed resources in the South and East China Seas, building roads and runways on islands to which they lack a legitimate claim of right. The S. China Sea Arbitration (Phil. v. China), PCA Case Repository No. 2013-19 (Perm. Ct. Arb. 2016), https://pca-cpa.org/wp-content/uploads/sites/175/2016/07/PH-CN-20160712-Award.pdf (rejecting China's claims). To the Chinese, their rights are rooted in historical claims of sovereignty. *See* Jane Perlez, *Tribunal Rejects Beijing's Claims in South China Sea*, N.Y. TIMES (July 12, 2016), http://www.nytimes.com/2016/07/13/world/asia/south-china-sea-hague-ruling-philippines.html?r=0 (reporting on the tribunal's rejection of China's argument that it has historic rights over most of the South China Sea). Some of these claims have been rejected by an international tribunal, though China has not acknowledged its authority. *Id.* Yet one wonders if this tradition of assertiveness in contests for resources could color the Chinese perspective. Some disputed territory is physically closer to countries who may therefore see themselves as ahead of China in line, while China may reject the concept of the line. China does make a first-in-time historic claim, but even if it were not first in the past, China was the first to build roads and runways in the present (and in some cases, the very islands underneath), taking the opportunity before others did. Of course, this extravagant psychological projection may hold no currency in this context—and either way, as a beneficiary of the 19th century U.S. policy of "manifest destiny" (a spectacular example of not respecting the first-come, first-served ethic of territorial claims), I realize that I am in a perilous position to point fingers.

every morning, usually before I left for work. But I was surprised to learn about it, because I would not have surmised this daily street cleaning from the look of the street by afternoon. That is, not until I actually saw what the street looked like in the morning before being cleaned—when it was strewn with fish guts, corn husks, banana peels, discarded vegetable parts, used cooking oil, and every other kind of refuse that you could imagine, left behind after the daily rush of morning street vendors. People discard these things on the street, expecting the city to clean it up, and the city does its best. But the hose can't get to everything, and a fair amount of refuse would accumulate in gutters and potholes. And there is no street-cleaner for the narrower village streets, forest parks, or beaches.

Not everyone in China offloads waste to public spaces, and some citizens even work purposefully to reverse the trend. In Qingdao, unheralded groups and individuals took it upon themselves to clean up after their fellow citizens, especially on the lovely Fushan Mountain behind our neighborhood, where many locals draw mountain spring water. I was regularly dismayed to see the bottles, paper products, and other odd objects abandoned along the path, but heartened to see the small signs left by members of an private organization that would occasionally clear the area of litter. Celebrating a similar spirit of public service, the *China Daily* reported movingly on the efforts of an elderly woman in Beijing who made it her personal task to comb trash out of Tiananmen Square each morning.[397] When I returned to Qingdao in 2016, I noticed that someone had helpfully hung a plastic garbage bag on a tree along the Fushan mountain path, presumably to help people contain their litter—although, frustratingly, trash was strewn on the ground within feet of the bag, which was mostly empty (until we filled it with that trash).

Admirable as they are, these crusaders fall outside the norm. While they conscientiously pick up others' garbage, others routinely drop trash without thinking much about it. In many parts of China, it's just a culturally permissible thing to do. We ourselves had to re-educate our four-year-old to do otherwise after we watched him proudly demonstrate that he had learned at school how to peel his own banana—and then dropped the peel on the ground, as though it had always belonged there. This may have been a four-year-old thing to do in any culture, but we couldn't help wondering if it came naturally to just drop it on the ground without thinking about it because he saw this happen around him so often. Chinese passengers commonly leave water bottles and other garbage behind in buses and taxis, too—and while this is also commonplace in the United States, what I haven't seen outside China are the taxi drivers who clean up what passengers have left behind by scooping the trash out of their car and into the gutter of the street.

[397] Despite ample effort, I was unable to locate an online copy of the print article I read in China (possibly because the CHINA DAILY blocks searches with the words "Tiananmen").

D. When the World is an Unclean Place

To be fair, littering is hardly a phenomenon unique to China. It remains a problem throughout the United States as well, especially demonstrated by American smokers who continue to discard cigarette butts indiscriminately, even after cultural tolerance for this waned with the 1970s environmental movement.[398] Littering in the U.S. is also regionally distinctive, and more pronounced in some parts of the country than others (as I have personally noticed in shuffling between Portland, Oregon and the Florida Panhandle). Littering seems more commonplace and regionally uniform in China, but at best, the comparison yields a difference in degree rather than a difference in kind.

However, other Chinese norms regarding waste management come closer to representing a difference in kind, at least from the norms with which we were most familiar. In China, cultural permission to discard waste in public places appears to extend far beyond water bottles and cigarette butts, further complicating the task of environmental management. The 10,000 dead pigs discarded into the Huangpu River presents an example that seemed extreme even by Chinese standards,[399] but for a more universal example, consider the Chinese tradition of encouraging children to use public streets while toilet-training.

Chinese toddlers are weaned from diapers early—a great environmental good, given the obvious environmental problems associated with disposable diapers. In the United States, for example, where the average baby goes through about 8,000 diapers,[400] parents use as many as 40 million disposable diapers a day[401]—most of which end up in landfills, where they will hold their mummified loads for the next 500 years.[402] Until reusable or biodegradable diapers become widespread, this is rightly a source of national shame. In China, however, toddlers wear pants with a split bottom—a vent that enables children to squat and unload wherever they happen to be when the urge hits.[403] Which leads to an

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[398] *The Problem & Facts*, KEEP AMERICA BEAUTIFUL, https://www.kab.org/cigarette-litter-prevention/problem-and-facts (last visited Apr. 23, 2018), ("The overall littering rate for cigarette butts is 65%, and tobacco products comprise 38% of all U.S. roadway litter.").

[399] *See supra* notes 98–104 and accompanying text.

[400] *Ten Fast Facts on Recycling*, U.S. ENVTL. PROTECTION AGENCY, https://web.archive.org/web/20150901213552/http://www.epa.gov/reg3wcmd/solidwasterecyclingfacts.htm (last visited Mar. 10, 2018) (reporting on amassing disposable diapers in landfills).

[401] *How Many Diapers Are Required Every Day to Satisfy the World Consumption?*, DISPOSABLE DIAPER INDUS. SOURCE, http://disposablediaper.net/?faq=how-many-diapers-are-required-every-day-to-satisfy-the-world-consumption/ (last visited Mar. 10, 2018) (reporting these statistics); *Diaper Facts*, REAL DIAPER ASSOC., http://www.realdiaperassociation.org/diaperfacts.php (last visited Mar. 20, 2018) (estimating that Americans use 23.1 billion disposable diapers every year).

[402] *The Future: Energy-Producing Diapers*, U.S. ENVTL. PROTECTION AGENCY (Nov. 19, 2009), http://blog.epa.gov/blog/2009/11/the-future-energy-producing-diapers/.

[403] *See* Erin Ryan, *Split Training Pants*, L. PROFESSOR BLOGS NETWORK (February 2012),

entirely different environmental problem.

No matter how often it happened, I was always surprised to emerge from our apartment to find a parent helping a squatting child beside the front gate.[404] Small piles of human waste on the sidewalk were commonplace, so we walked carefully, eyes cast down on constant guard. I have seen parents allow their children to relieve themselves into large potted plants at airports. I once saw a child have a toilet-training accident in the aisle of a big-box store, and while the child was immediately whisked away to be cleaned, the resulting pile was left behind for others to avoid. It is not uncommon to see men urinating along streets and sidewalks, notwithstanding nearby public toilets erected to accommodate neighborhoods without indoor plumbing. Both men and women spit openly on the streets and sidewalks.

This cultural difference may have been especially salient to us because our year in China coincided with the time we were toilet training our own toddler. His teachers at school always encouraged children to use the school bathroom, which included both squat johns and a western toilet. But when we were out with friends or otherwise around town, he watched his playmates relieve themselves at will, and felt culturally entitled to do the same. For him, having arrived in China at age three, this was simply the way the world worked. Reacting to our own American norms, we worked hard to redirect his efforts to restrooms wherever possible, but on one memorable walk home from school, he suddenly stopped, dropped trou, and made a deposit on the stone stairs next to the grocery store before we could do anything about it. My mortified husband returned immediately with a plastic bag to clean it up as an American dog-walker would, but our son was proud of his own performance.

E. No "Five-Second" Rule

With so much Chinese ground thus anointed, the outside environment is generally (and correctly) viewed as a terribly unclean place. The American "five-second-rule" is humorously gross in the United States, but unimaginable in China—because even indoor floors are trod upon by shoes that have walked through countless stages of decomposing goodness-knows-what. A Chinese student, eyes wide with horror, once asked me whether it was true that American students sit or even recline on campus lawns between classes. I laughed at the

http://lawprofessors.typepad.com/.a/6a00d8341bfae553ef017c333875b2970b-pi.

[404] *See, e.g.*, Austin Ramzy, *Tempest Over a Chamber Pot, as Taiwan Scrutinizes Mainland Tourists' Manners*, N.Y. TIMES (Oct. 22, 2014), http://sinosphere.blogs.nytimes.com/2014/10/22/tempest-over-a-chamber-pot-as-taiwan-scrutinizes-chinese-tourists-manners/?_php=true&_type=blogs&emc=eta1&_r=0 ("Parents allowing their children to relieve themselves over trash cans, pieces of paper or sometimes just the sidewalk are not uncommon sights on the mainland."). Then again, Japanese and Europeans find it equally surprising to discover that Americans do not generally use bidets.

time, but months later would find myself cringing as a group of visiting American students sat to rest on the gracious exterior stairs of a provincial museum, untroubled by what might lie beneath them.

Similarly, Chinese friends would gasp when I instructed my toddler to hold stair handrails, worried about what hands had been there before him, and what those hands might have touched. Their view (which I ultimately adopted) was that it was actually better for him to fall down the stairs than to allow whatever was on those railing to get onto his hands, which would inevitably end up in his mouth. By necessity, Chinese parents wean thumb-suckers incredibly early, and by whatever means necessary. This was especially difficult for us, as we had been indulgent on the thumb until we became accustomed to our new Chinese norms. Our Chinese friends were scandalized to see how often our son's thumb drifted toward his mouth—and doubtlessly wondered how we, who seemed like such nice people, could be such incapable and irresponsible parents.

Amusing stories all, but here's the real point. If we limit the analysis to the environmental consequences of toilet training, then the Chinese tradition is probably preferable to the American habit of mummifying countless millions of disposable diapers each day. Score for vented pants!

But what if we broaden the analysis beyond toilet training? Consider the potential environmental ramifications. If one learns to see the world outside the home as a legitimate place to offload waste—even E. coli-laden human waste—might this attitude extend to the realm of greater environmental management? In other words, if it's culturally permissible to drop litter (and worse) on the street or the beach, then why wouldn't it be okay to release toxic manufacturing waste into the river, or pipe it into the air? By this reasoning, why *wouldn't* you dump thousands of rotting pig carcasses into the Huangpu River? Where else would you put them?

The implications for environmental law are obvious. Because if the metaphor does extend, then the challenge for environmental law is not just an economic one, by which the government must convince industrialists that pollution is in not in their long or short-term commercial interest. In some important way, and one much harder to reverse, environmental law is also a cultural challenge. Professional polluters aren't just polluting because it's cheaper than the alternative. They are doing it because—at some level—it's what most Chinese people have always done, and without moral misgivings. Offloading private waste into public spaces is a socially acceptable practice, if not the cultural norm itself. This is something that environmental policymakers on both sides of the Pacific must understand.

VIII. ENVIRONMENTAL PHILOSOPHY AND HUMAN RELATIONSHIPS WITH NATURE

The next two essays were primarily written over the last few days of my

Fulbright year in China, while I was reflecting on underlying cultural differences that have led to some of the contrasting approaches to environmental management in the United States and China. As suggested earlier, some of that contrast can be traced to the different stages of economic development in the two countries—but even that important difference cannot account for everything. To make sense of the other sources of contrast, this first essay probes differences in the underlying environmental philosophies in both countries, with special attention to the quality of relationships that Americans and Chinese maintain with the natural world around them.

A. Concessions and Qualifications

These final musings from the field engage material that is as delicate as it is important, touching on cultural and philosophical traditions that have been simmering beneath many of the substantive environmental issues I've addressed before now. With the help of so many patient teachers (many of them my own students), I began to appreciate deep cultural differences that helped enlighten some of my more surprising environmental experiences in China. At bottom, these cultural differences reflect distinctive features of the underlying environmental philosophies that inform policy-making and ordinary life in the two countries.

Discussing cultural differences is an inherently fraught project, as well it should be. The conversation probes aspects of cultural identity that one must be exquisitely careful about describing, let alone evaluating. Every culture has elements that are puzzling, even troubling to those outside it. (To test this proposition, ask virtually any non-American what they think about our Second Amendment—or for that matter, our First!) Yet as dangerous as such discussions always threaten to be, I brave one here because these differences relate so directly to the challenges of global environmental governance that it seems critical to at least broach the subject. Perhaps my good intentions will help mitigate my inevitable failures (although even good intentions can't make up for actual harm).

In acknowledging these difficulties, I begin with the humble qualification that my observations are necessarily and hopelessly entangled with my own cultural vantage point. My Fulbright year did not make me an expert on the inner worlds of Chinese people, nor did my Harvard degree in Chinese history and culture. My observations qualify as neither empirical scholarship nor serious ethnography, based as they are on personal experiences, anecdotes, generalizations, and incomplete academic research. But in the hope that they may usefully illuminate the philosophical roots of some of the gaps between Chinese and U.S. approaches to environmental management, I share them here.

These final essays from the field contrast environmental perspectives as revealed through our different relationships with nature; our approaches to

sustainability, stewardship, and scarcity; and our different philosophical traditions. This first essay addresses the surprisingly different qualities of our respective relationships with nature—conceding with Bill Cronon that the very concept of "nature" can be a loaded cultural construct[405]—and how that might impact our respective visions of environmental law.

B. U.S. Traditions of Multiple Use, Sustained Yield, and Wildness

The average Chinese perspective contrasts with American counterparts in many ways, and at seemingly every level—whether comparing Chinese undergraduates with American college students, farmers with farmers, bureaucrats with bureaucrats, or grandmothers with grandmothers. So it's only natural that we're not going to see things exactly the same way when it comes to the environment, and even nature itself. Of course, we do share some important baselines: we pretty much all like pandas, and we all agree that our children should not be poisoned by toxic chemicals carelessly released into the environment. But beyond that—what are the contours of our ethical relationships with that environment, and to what extent might it inform natural resource management choices?

From the modern U.S. perspective, American natural resource laws mostly attempt to balance competing demands for scarce resources, including public land and water resources that are simultaneously valuable for extractive, recreational, aesthetic, and intrinsic reasons. We came to this idea of balance after the first half of American history, during which our policies erred squarely on the side of extraction and reclamation.[406] But today, this idea is the essence of our "Multiple Use, Sustained Yield" approach in managing National Forest and BLM lands, and it is even reflected in the tension between the occasionally competing mandates to provide for the enjoyment of our National Parks by both present recreationalists and future generations.[407]

We seek an idealized balance, but that balance is constantly contested because Americans remain divided over key management issues. We differ about when to err on the side of extraction or preservation, whether to proceed from an anthropocentric or biocentric management ethic, and when to prioritize present

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[405] *See* CRONON, *supra* note 50, at 310 (discussing how nature is culturally constructed and how those with differing experiences develop their own "distinct meanings and definitions of 'nature' and of what constitutes proper human/environment interrelations and practices").

[406] *See generally Environment and Natural Resources Division—About the Division: History*, U.S. DEP'T JUST. http://www.justice.gov/enrd/ENRD_history.html (last updated May 15, 2015) (discussing American struggles to balance competing interests in preservation and extraction over early American history); RASBAND ET AL., *supra* note 57, at 29–30.

[407] *See, e.g.*, Harmony A. Mappes, Note, *National Parks: For Use and "Enjoyment" or for "Preservation"? and the Role of the National Park Service Management Policies in That Determination*, 92 IOWA L. REV. 601 (2007) (discussing contradictory mandates and management policies).

or future needs. Today's debate features environmentalists who favor preservation and lower-impact recreation versus "wise-use" advocates who favor freer extraction and recreation policies.[408] Yet the same conflicts have played out for at least the last 150 years of U.S. natural resources policy, since the early contests between John Muir, progenitor of the National Park Service's preservation mandate, and Gifford Pinchot, architect of the U.S. Forest Service's multiple use mandate.[409]

Even so, while today's John Muirs and Gifford Pinchots may disagree on the precise balance, most Americans have found common ground in the belief that we ought to protect at least some natural areas from as much human intervention as possible, in at least some circumstances.[410] There is a visceral appreciation among most stakeholders that there is value in preserving some degree of "wildness" in these areas—although they may embrace this idea for very different reasons, and they will often choose different ways of enjoying the wilderness they want to preserve.[411] I am admittedly oversimplifying here, but as a former U.S. Forest Service ranger east of Yosemite National Park, I never once met a Sierra Club hiker, four-wheeling rancher, Audubon Society birder, or Ducks Unlimited hunter who didn't sing the praises of their respective pilgrimages to the backcountry, where they found communion with their respective ideal visions of the natural world.

This regard for a wild, relatively unmediated experience of nature was the intuition behind the U.S. National Park system, by which we purposefully set aside remarkable natural areas like Yosemite and Yellowstone from further human modification.[412] Here, American public policy proceeds from a generally

[408] *See, e.g.*, LESLIE PAUL THIELE, ENVIRONMENTALISM FOR A NEW MILLENNIUM: THE CHALLENGE OF COEVOLUTION 202-08 (1999) (discussing conflicts between environmentalist and wise-use approaches to natural resource stewardship).

[409] Kelli Barrett, *Muir-Pinchot Debate Lives on in Challenge to New Forest Rule*, ECOSYSTEM MARKETPLACE (Sept. 6, 2012), http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=9241&section=news_articles&eod=1 ("[T]he US Forest Service (USFS) has been torn between two closely related mandates—that of founding USFS Chief Gifford Pinchot (to conserve forests primarily for the natural resources found there), and that of Sierra Club founder John Muir (to preserve forests for their inherent beauty and recreation).").

[410] *See, e.g.*, The Wilderness Act, 16 U.S.C. §§ 1131-1136 (1964) ("In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.")

[411] I distinguish here between this concept of "wildness" and the legal definition of "wilderness" in the U.S. Wilderness Act of 1964 (defining wilderness more specifically as "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions"). 16 U.S.C. § 1131(c).

[412] National Park Service Organic Act of 1916, Pub. L. No. 64–235, 39 Stat. 535, (establishing the National Park Service to manage parks, monuments, and reservations "to conserve the scenery

shared conviction that the best in nature is somehow at its best when it is left alone. We admittedly transform nature for countless economic reasons elsewhere, but we commit to leaving at least some of it unchanged—a belief that was affirmed even more forcefully by the Wilderness Act of 1964.[413]

The romantic ideal of nature unmediated by human impact may be dated, now that even Arctic ice is contaminated with the chemical residues of industrial development.[414] Still, it runs so deep in American cultural consciousness that our National Parks remain a centerpiece of family recreation, a visual representation of pride in country, and a psychological trope exploited for selling things as ironic as sport utility vehicles.[415] Even during today's tumultuous political climate, in which states like Utah and Arizona are demanding state control over in-state federal lands, they specifically exempt the National Parks.[416] Renowned documentarian Ken Burns famously called the National Parks "America's Best Idea,"[417] and so many Americans agree that the greatest threats to our overwhelmed parks today is too much love by too many annual visitors.[418]

Of course, neither Ken Burns nor I can speak for every American. The Park Service itself is concerned that, on average, Americans belonging to racial minority groups may be less enamored of the National Parks, at least based on visitation statistics.[419] Moreover, most Americans are also proud of the great human accomplishments that we have made in spite of nature's obstacles, such as the great cities we have built in improbably wet, dry, and mountainous

and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations").

413 *Id.* at § 1131–36.

414 Melissa A. Verhaag, *It Is Not Too Late: The Need for a Comprehensive International Treaty to Protect the Arctic Environment*, 15 GEO. INT'L ENVTL. L. REV. 555, 555–556 (2003) (noting that industrial pollution can be found in the arctic environment).

415 *See, e.g.*, Jennifer Leslie, *Exclusive: New Mercedes-Benz SUV Takes on Stone Mountain*, 11 ALIVE (Oct. 26, 2016), http://www.11alive.com/news/exclusive-new-mercedes-benz-suv-takes-on-stone-mountain/341473860 (reporting on a promotional video for Mercedes-Benz).

416 Kirk Johnson, *Utah Asks U.S. to Return 20 Million Acres of Land*, N.Y. TIMES (Mar. 23, 2012), http://www.nytimes.com/2012/03/24/us/utah-bill-asks-government-to-give-back-more-than-20-million-acres-of-land.html?_r=0 ("The bills in Utah and Arizona exempt national parks, military installations and most national monument lands, for example – all of which, especially the parks, have become major rural economic engines.").

417 DAYTON DUNCAN & KEN BURNS, THE NATIONAL PARKS: AMERICA'S BEST IDEA (2011).

418 *See* Dayton Duncan, *Are We Loving Our National Parks to Death?*, N.Y. TIMES (Aug. 6, 2016), http://www.nytimes.com/2016/08/07/opinion/sunday/are-we-loving-our-national-parks-to-death.html?_r=0 (describing measures to limit visitation to overwhelmed parks, such as entry fees or automobile bans).

419 Kirk Johnson, *National Parks Try to Appeal to Minorities*, N.Y. TIMES (Sept. 5, 2013), http://www.nytimes.com/2013/09/06/us/national-parks-try-to-appeal-to-minorities.html?hp&_r=0 (noting that -only one in five national park visitors is nonwhite, and only 1 in 10 is Hispanic). These statistics may reflect the fact that racial minorities are disproportionately poor in the United States, and thus unable to access the National Parks in the same number as their white counterparts, and they may also reflect underlying preferences—or both.

places,[420] and such groundbreaking public works as Hoover Dam,[421] the Erie Canal,[422] and the interstate highway system.[423] These feats of human engineering form the backbone of national infrastructure that enabled American economic development to the point where many families can now afford that iconic road trip to the National Parks.[424] But as proud (and utterly dependent) as we are on the national highway system, Americans are generally even prouder of those treasures in our National Park System that seem to tell us something about who we are as a nation. After all, there are roads all over the world! But there is only one Grand Canyon.

C. The Chinese Tradition of Dominion over Nature

Most modern Chinese see the human relationship with nature differently, and from the bottom on up. I was surprised by this, because I had been taught that traditional Chinese landscape paintings—of stunning natural vistas with tiny people in the periphery—pay homage to a natural order in which human beings play a proportionately small role. When studying Chinese history for my degree in East Asian Languages and Civilizations, I had learned how the tradition of Taoism taught Chinese people to live in harmony with nature,[425] and how Chinese Buddhism implies compassion by identification with all living things in nature.[426] It may be that these ancient philosophies informed the dominant cultural ideals over past periods of Chinese history, but today, in both government policy and popular consciousness, sentiments have shifted.

Rather than live in harmony with nature, human beings have sought to master nature in China—perhaps even more so than in most places on earth. And while

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[420] For example, parts of the nation's capital, Washington, D.C. were built on filled wetlands. Drew Robarge, *Washington, D.C.'s 19th Century Reclamation Project*, ATLANTIC (Mar. 28, 2011), https://www.theatlantic.com/technology/archive/2011/03/washington-dcs-19th-century-reclamation-project/73078/.

[421] *The Story of Hoover Dam*, U.S. DEP'T INTERIOR BUREAU RECLAMATION, http://www.usbr.gov/lc/hooverdam/History/storymain.html (last updated Feb. 8, 2017).

[422] *Erie Canal: 175th Anniversary*, ERIECANAL.ORG, http://www.eriecanal.org/UnionCollege/175th.html (last visited Jan. 17, 2017).

[423] *History of the Interstate Highway System*, U.S. DEP'T TRANSP. FED. HIGHWAY ADMIN., https://www.fhwa.dot.gov/interstate/history.cfm (last updated June 27, 2017).

[424] *See, e.g.*, *Every Kid in a Park*, NAT'L PARK FOUND., https://www.nationalparks.org/our-work/campaigns-initiatives/every-kid-park (last visited Jan. 24, 2018) (describing a program encouraging family enjoyment of the National Parks by providing free access to elementary school children and their families during the fourth grade year).

[425] *See* WING-TSIT CHANG, A SOURCEBOOK IN CHINESE PHILOSOPHY 139 (4th prtg. 1973) (translating Lao Tzu's *Tao-te Ching*, the principle book of Chinese Taoism).

[426] "The Buddha is now preaching to all living beings in the world and all living beings are receiving the Buddha's preaching in this world. Therefore the Buddha is the Buddha of all living beings and living beings are living beings of the Buddha." *Id.* at 418 (quoting from *The Hundred Gates to the Sea of Ideas of the Flowery Splendor Scripture* of the Hua-Yen School of Chinese Buddhism).

nature still seems to have the upper hand (as the 2008 Sichuan earthquake reminded its 87,000 victims, and the nearly five million it left homeless),[427] the Chinese have made remarkable progress toward their goal. The Three Gorges Dam—the largest hydroelectric dam in the world and only the latest component of the colossal South-North Water Transfer Project—provides testimony to the ambitiousness of Chinese natural resource management.[428] The Three Gorges Dam is five times higher and with twenty times the generating capacity of the Hoover Dam in the United States.[429] NASA has calculated that the reservoir impounds so much water that it has actually (if modestly) changed the rotation of the earth.[430]

By mechanisms cultural and political, the traditional Chinese reverence for the integrity of natural systems has waned, ironically just as Americans were "finding religion" in nature.[431] Americans went from an early ethos of ruthlessly bending nature to our will—taming mighty rivers and "reclaiming" the desert through massive dam and irrigation projects[432]—to a modern turnaround in which we are now dismantling the very same dams to return ecological systems to a more natural state.[433] The Chinese, it would seem, have been on the opposite trajectory—albeit one that is understandable in light of the cycles of flooding, drought, and famine that have besieged China disproportionately to the rest of the world. China has experienced five of the top ten natural disasters in recorded world history,[434] most recently including the 1931 Central China Flood that

[427] *See Sichuan 2008: A Disaster on an Immense Scale*, BBC NEWS (May 9, 2013), http://www.bbc.com/news/science-environment-22398684.

[428] *See, e.g.*, Scott Moore, *China's Massive Water Problem*, N.Y. TIMES (Mar. 28, 2013), http://www.nytimes.com/2013/03/29/opinion/global/chinas-massive-water-problem.html?_r=0 (describing the project as "a testament to the limits of engineering solutions to problems of basic environmental scarcity"). *See also supra* notes 180-182 and accompanying text (describing the project).

[429] Brian Handwerk, *China's Three Gorges Dam, by the Numbers*, NAT'L GEOGRAPHIC MAG. (June 9, 2006), http://news.nationalgeographic.com/news/2006/06/060609-gorges-dam_2.html.

[430] Cutler Cleveland, *China's Monster Three Gorges Dam Is About to Slow the Rotation of the Earth*, BUS. INSIDER (June 18, 2010), http://www.businessinsider.com/chinas-three-gorges-dam-really-will-slow-the-earths-rotation-2010-6 (citing NASA calculations that the mass of the dam would increase the length of day by 0.06 microseconds and make the Earth slightly more round in the middle and flat on the top).

[431] *See* CRONON, *supra* note 50, at 36-43 (discussing nature as Eden).

[432] *See, e.g.*, Christine Klein, *On Dams and Democracy*, 78 OR. L. REV. 641, 646 (1999) (describing the construction of 5,500 large and 100,000 small dams in the United States, capable of storing one billion acre-feet of water).

[433] *See, e.g.*, Elizabeth Brink, *The Long Road to River Recovery*, INT'L RIVERS (June 6, 2011), http://www.internationalrivers.org/resources/the-long-road-to-river-recovery-1673 (describing the advance of dam-removal campaigns in the western United States).

[434] Remy Melina, *Top Ten Deadliest Natural Disasters in History*, LIVE SCI. (June 1, 2011), http://www.livescience.com/33316-top-10-deadliest-natural-disasters.html (listing the Haiyuan, Tangshan, and Shaanxi Earthquakes and the Yellow River and Central China Floods as among the ten worst disasters of all time).

killed nearly five million people and displaced some fifty million others, right on the heels of the 1928-1930 North China drought and associated famine that had already killed two million others.[435]

Just as in the U.S., Chinese environmental policy seeks to balance many competing interests, and with even greater urgency, given the continuing crisis of rural poverty. After all, the Three Gorges Dam—though controversial for altering ecosystems, triggering landslides and earthquakes, and displacing millions of people[436]—was designed to bring electricity, commercial navigation, and flood relief to tens of millions of others, many without other means.[437] In contrast to U.S. policy, however, the consideration of John Muir-style preservation—whether for anthropocentric or biocentric reasons—ranks low, if at all, on the scales.

In fact, my Chinese Natural Resources Law students were baffled by the very idea of biocentric environmental ethics, in which nature is considered to have value independent of direct human needs. To be sure, many Americans are equally utilitarian, but they tend to see the biocentric viewpoint as romantic or idealistic, even if wrongheaded. For my Chinese students, it was simply incomprehensible—as in, hard to grasp what biocentrism actually means. But even from the vantage point of anthropocentric utilitarian values—the ideal that nature is valuable because people derive benefit from it—preservation ranks low in the national interest.[438]

Part of the reason for this doubtlessly comes from the pressure of managing such an immense population on so comparatively small a chunk of land. The vast majority of China's 1.4 billion people live only on the eastern and central part of the nation's overall land area, which is comparable to, say, the eastern

[435] *Compare* Steve Harnsberger, *The Great Floods of 1931 at Gaoyou*, ABOUT GAOYOU, http://aboutgaoyou.com/history/floods/the_floods.aspx (last updated Sept. 25, 2007) (describing the 1931 Central China flood, which killed as many as 4 million people), *with* U.N. Pub. Admin. Network, *China Top Ten Natural Disasters*, http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan009381.pdf (last visited Jan. 17, 2017) (highlighting the deaths following the drought of 1928, which killed over 2 million people).

[436] Mara Hvistendahl, *China's Three Gorges Dam: An Environmental Catastrophe?*, SCI. AM. (Mar. 25, 2008), http://www.scientificamerican.com/article/chinas-three-gorges-dam-disaster/ (discussing landslides and other environmental problems associated with the dam).

[437] Bruce Kennedy, *China's Three Gorges Dam: China's Biggest Construction Project Since the Great Wall Generates Controversy at Home and Abroad*, CNN, http://edition.cnn.com/SPECIALS/1999/china.50/asian.superpower/three.gorges/ (last visited Mar. 20, 2018) (discussing the pros and cons of the Three Gorges Dam).; *see also* Jeremy Berkoff, *China: The South–North Water Transfer Project—Is it Justified?*, 5 WATER POL'Y 1 (2003), http://faculty.washington.edu/stevehar/chinenv-berkoff.pdf (considering whether the benefits of the project outweigh its expense).

[438] There is evidence that this may slowly be changing, but still very slowly. *See* Ziliang Guo & Guofa Cui, *Establishment of Nature Reserves in Administrative Regions of Mainland China*, 10(3) PLOS ONE e0119650 (2015), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4358836/ (noting that new nature reserves have been established, but that the total area of preserved land remains inadequate, especially in the most populated areas of the country: "[i]n North China, East China, Central China and South China, the percentages of protected area are… less than 5%").

half of the United States.[439] The Sichuan Basin, similar in size to the state of Michigan, is home to some 100 million people (by contrast, the actual population of Michigan is under ten million).[440] The North China Plain, including the Shandong Peninsula where we lived, is about the size of Texas but home to more than the entire U.S. population.[441] This kind of population density understandably changes the calculus in allocating scarce natural resources, including physical space. Most Chinese would happily trade wild open space for new housing developments, usually out of sheer necessity.

Still, China doesn't exactly lack open space; the western mountains and deserts that constitute half of China's territory are home to only 6% of the population.[442] And though there is more densely populated land in China than the United States, the population density of New York City ranks close to Beijing,[443] and many native New Yorkers (myself among them) still crave a personal relationship with wilderness. Yet by and large, most urban Chinese people do not. Even though there is a burgeoning domestic tourist industry to serve China's burgeoning middle class, ecotourism of the American family-camping and river-rafting variety has not been part of it.

Of course, many Americans also find the idea of camping unappealing, especially among minority racial groups[444]—but what distinguishes China is that almost nobody seems interested in back-to-nature experiences. Of note, I saw signs of change between 2011 and 2016; when I returned to Qingdao in 2016, I was surprised to see a newly constructed city park with a few recreational tents (pitched unromantically along the open public walkway). However, my Chinese friends dismissed them as little more than a curiosity. As they explained, most Chinese would never be interested in recreational camping: "It took such effort to get indoor heating and plumbing—why would we want to go back to sleeping

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439 *See, e.g.*, Jeffrey Hays, *Population of China: Statistics, Trends, Patterns and Consequences*, FACTS & DETAILS http://factsanddetails.com/china/cat4/sub15/item129.html (last updated June 2015) (reporting that China's population surpassed 1.34 billion in 2010, and that western lands house only 6% of the population but make up half of China's territory).

440 *Id.*; *see QuickFacts: Michigan*, U.S. CENSUS BUREAU, https://www.census.gov/quickfacts/MI (last visited Feb. 25, 2018).

441 Hays, *supra* note 439.

442 *Id.*

443 *Compare New York City Population: Population Facts*, N.Y. CITY DEP'T CITY PLAN., http://www1.nyc.gov/site/planning/data-maps/nyc-population/population-facts.page (last visited Feb. 25, 2018) (reporting that in 2011 New York City had a population density of over 27,000 people per square mile), *with Population Increases to be Biggest Worry for Beijing*, PEOPLE'S DAILY (July 19, 2011), http://english.people.com.cn/90001/90776/90882/7444157.html (reporting that the population density in the city center of Beijing is at 7,837 persons for each square kilometer).

444 *See supra* note 419 and accompanying text; *see also* Ryan Kearney, *White People Love Hiking. Minorities Don't. Here's Why.*, NEW REPUBLIC (Sept. 6, 2013), https://newrepublic.com/article/114621/national-parks-popular-white-people-not-minorities-why (noting that minorities are less interested than white counterparts in hiking, and generally prefer vacationing in hotels to camping without electricity).

outside?!"[445]

D. Man-Made China

Developmental pressures aside, differences in the quality of the human relationship that the average American and Chinese share with nature are evident at the cultural level, reflected in recreational preferences, land management policies, and cultural pride.

Of course, the average American didn't always love wilderness—for the first hundred or so years of American history, western settlers cursed the wilderness for threatening their very survival.[446] New Yorkers like me only developed our taste for wilderness when our safety within well-developed cities had become so secure that civilization itself grew boring, and it was wilderness—an increasingly scarce resource—that seemed novel. Indigenous Americans have long enjoyed a very different relationship with nature, and later-comers have learned from their example over our last century together.[447] Still, Chinese civilization had made its peace with the natural world for thousands of years before American settlers cursed and then longed for their wilderness. It was just, in many regards, a different kind of peace.

Chinese culture has long celebrated the natural world in achingly beautiful paintings, poetry, and the placement of simple pagodas from which to contemplate the splendor of mountains and rivers, but China has also long celebrated its extraordinary ability to manipulate nature as needed to suit human ends—both functional and aesthetic.[448] As a nation, the Chinese take great cultural pride in their proven ability to remake the natural world in ways that have offered tangible benefits to their people over the eons. One term for this pride that I learned while touring the western mountains and deserts roughly translates to "Man-Made China."[449]

In many cases, the Chinese have remade nature to survive and even thrive

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[445] Similar reasons may underlie the contrasting preferences for camping among white and minority Americans. *See* Johnson, *supra* note 419 ("The idea of roughing it in a tent, however, can feel to some people like going backward, said Ms. Cain, a first-generation [Puerto-Rican] American who said the stories in her family about escaping the hard rural life still resonate.")

[446] RASBAND, *supra* note 57, at 29–30 (noting that wilderness posed a barrier to progress and prosperity during the Westward expansion, and quoting Aldo Leopold: "It was an obstacle, something to be conquered… '[a] stump was our symbol of progress.'").

[447] *See, e.g.*, National Park Service Organic Act of 1916, *supra* note 412 (reflecting a rough starting point for the shift in American federal policies toward greater conservation of remarkable pristine lands).

[448] *See generally* David Barboza, *In China, Projects to Make Great Wall Feel Small*, N.Y. TIMES (Jan. 12, 2015), http://www.nytimes.com/2015/01/13/business/international/in-china-projects-to-make-great-wall-feel-small-.html?emc=edit_th_20150113&nl=todaysheadlines&nlid=46665420&_r=0 (discussing China's many multibillion-dollar projects and long history of mega-projects).

[449] The Chinese phrase is *Renzao Zhongguo* and while the sentiment is widely held, the term itself may be new.

within the most challenging of natural environments. The fifty-year South-North Water Transfer Project and the Three Gorges Dam are only the latest example of a cultural tradition that extends back several thousand years.[450] As I described in Part IV, the native Xinjiangnese did this by creating thousands of kilometers of the Turpan Karez's underground water channels over thousands of years, each dug by hand to keep mountain streams from evaporating before reaching cropland eked out of the Takla Makan desert.[451]

Another ancient example is the Dujiangyan Irrigation System west of Chengdu, one of the three great hydraulic engineering projects of ancient China.[452] More than two thousand years ago, civic engineers there calculated how to seasonally split the Minjiang River just so—in a way that provides merciful flood relief to the lands annually inundated by spring meltwater on one side and critical irrigation to the lands on the other side that would afterward become the breadbasket of China.[453] Now celebrated as a U.N. World Heritage Site, the project functions to this day, using "natural topographic and hydrological features to solve problems of diverting water for irrigation, draining sediment, flood control, and flow control without the use of dams," all while leaving the river channel open for commercially and strategically important navigation.[454]

Americans and others have also learned to alter nature for purposes of human safety and economic development—but in China, projects like Dujiangyan hold a place of pride in the Chinese heart that roughly corresponds with the place the Grand Canyon occupies in the American psyche. All Chinese school children are taught to take pride in the three ancient water projects that attest to Chinese dominion over nature: the Dujiangyan irrigation system; the Ling Canal that links the Yangtze and Peal River through the mountains of Guilin; and the Grand Canal, linking five river systems in six provinces north to south over 1,114 miles.[455] The Grand Canal, completed during dynasties that extended from 770 B.C.E. to 1368 C.E., is the earliest and longest canal in the world—16 times longer than the Suez Canal and 33 times longer than the Panama Canal—and today forms the backbone of the ongoing South-North water project.[456]

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[450] *See supra* notes 180–182 and accompanying text (discussing the Water Project) and 427–430 (discussing the Dam).

[451] *See supra* notes 184–188 and accompanying text (discussing the Turpan Karez).

[452] *See generally Mount Qingcheng and the Dujiangyan Irrigation System*, UNITED NATIONS EDUC., SCI. & CULTURAL ORG., http://whc.unesco.org/en/list/1001 (last visited Dec. 1, 2016) (describing the Dujianyan Irrigation System).

[453] *See id.*

[454] *Id.*

[455] *See generally id.*; *Ling Canal*, ENCYCLOPEDIA BRITANNICA, https://www.britannica.com/topic/Ling-Canal (last visited Mar. 20, 2018); *The Grand Canal*, UNITED NATIONS EDUC., SCI. & CULTURAL ORG., http://whc.unesco.org/en/list/1443 (last visited Dec. 2, 2016).

[456] *The Grand Canal*, *supra* note 455.

One wonders how this cultural difference could bear on environmental policies that might confuse unfamiliar westerners. For example, ambitious geo-engineering projects that might give pause to many Americans[457] might seem like nothing more than the logical next step of civil engineering to most Chinese. Seed the oceans with iron to absorb carbon, or deploy stratospheric aerosols to reflect sunlight—why not? Any schoolchild knows that China had already moved rivers through mountains, irrigated the desert, and joined thousands of miles of waterways thousands of years earlier. In advance of the 2008 Olympics, China showed that it could even clean up the air when it really wanted to.[458] Today, China is building thousands of acres of man-made islands, complete with ports, light houses, and military bases, in the South China Sea.[459] What's a little rust in the ocean, or some additional dust in the sky? If Man-Made China is a good thing, why not Man-Made Earth?

E. Improving on Nature

Related to national pride in Man-Made China is the strong preference that most Chinese hold for managed nature—nature improved upon by conspicuous human intervention—over the kind of pristine wilderness that Americans so often prefer.

You can see it in the stunningly beautiful Chinese gardens of sculpted trees, flower beds, carefully placed rocks (often imported from great distances), usually permeated by a carefully designed creek leading to a pond improbably stocked with huge, crimson koi. These are the places where people go to enjoy nature, but like an (even more elaborate) English Garden, they are enjoyed as a work of human-mediated art. Just as nature-enthusiasts in the United States might go for a day hike to watch birds in the wild, Chinese nature enthusiasts go to a managed garden to "*shang hua*," or appreciate the carefully groomed flowers. Early American colonists and their Europeans forbearers shared a similar regard for pastoral version of nature, cultivated in farms and gardens. But together with Thoreau and the Transcendentalists,[460] Aldo Leopold and the land ethicists,[461] and even through the crossfire between John Muir and Gifford Pinchot,[462] many Americans developed something of a "back to nature"

[457] *See* Clive Hamilton, *Geoengineering Is Not a Solution to Climate Change*, SCI. AM. (Mar. 10, 2015), https://www.scientificamerican.com/article/geoengineering-is-not-a-solution-to-climate-change/ (critiquing geoengineering as a means to combat climate change).

[458] *See supra* note 215 and accompanying text.

[459] Derek Watkins, *What China Has Been Building in the South China Sea*, N.Y. TIMES (Feb. 29, 2016), http://www.nytimes.com/interactive/2015/07/30/world/asia/what-china-has-been-building-in-the-south-china-sea-2016.html.

[460] HENRY DAVID THOREAU, WALDEN; OR, LIFE IN THE WOODS (1854) (one of the defining works of the transcendentalists).

[461] ALDO LEOPOLD, A SAND COUNTY ALMANAC (1949) (defining the land ethic).

[462] See supra notes 408–411 and accompanying text (discussing the history of Muir and

idealism. This idealism—reflected in our shared love of the National Parks[463]—is one that most modern Chinese don't share.

In fact, the average Chinese preference for heavily mediated nature extends all the way to their own National Parks. Even in magnificent natural areas that the government has set aside for use as parks, the natural wonders within are improved upon. I learned this most poignantly while visiting Tianshan Tianchi, "Heavenly Lake of the Celestial Mountains," a high alpine lake nestled among the Tianshan mountains in northwest China.[464] I had learned of the place on my first day teaching Natural Resources Law in Shandong, when I asked my students if there was a Chinese analog to the American Arctic National Wildlife Refuge—a famous but remote wilderness that all would know of, but few would ever visit.[465] They described this very place in Xinjiang Province, and I was thrilled to later visit it while guest-lecturing at a university in Urumqi.

Like an American National Park, the site was protected from development in a region rich with extractable resources, and you could enter only in an approved guided tour bus that crept up the mountains alongside a river draining the lake. But unlike an American National Park, the once wild mountain river had been terraced into a series of flat concrete pools, elegantly designed to spread the water out and slow it down on its journey down the mountainside. It was lovely, in that Chinese-garden way, though it had nothing to do with the mountain stream hydrology that I had expected to see. (Though it is exactly what I *should* have expected, having seen similar things at many other Chinese parks.)

At the top, the lake itself was stunning, surrounded by snow-covered peaks and passes reminiscent of the Swiss Alps. That is, except for the crackling speakers—poorly camouflaged as tree stumps and boulders—that lined the paved trail every few feet, piping in music to complete the experience.[466] And they were not playing a peaceful mountain flute, erhu, or even traditional Chinese music. As I live and breathe, what I heard as I summited the Heavenly Lake of the Celestial Mountains was Michael Jackson—"Bad," I believe—followed by Abba. Which also shouldn't have surprised me too much, as audio-enhancement is fairly common among nature parks here. As often as not, even uncultivated nature parks that I have visited were graced with piped-in thematic music (though usually something more fitting than Michael Jackson).

To enjoy the area in the absence of Abba, I asked the park guide where to find

Pinchot).

[463] See supra notes 412–413 and accompanying text (discussing the history of the U.S. National Park System).

[464] *See* Erin Ryan, *Heavenly Lake of the Celestial Mountains*, L. PROFESSOR BLOGS NETWORK (Jan. 2012), http://lawprofessors.typepad.com/.a/6a00d8341bfae553ef017d3c0147df970c-pi.

[465] *See generally Arctic National Wildlife Refuge*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/refuge/arctic/ (last updated Sept. 7, 2017).

[466] *See* Erin Ryan, *Disguised Speaker at Heavenly Lake*, L. PROFESSOR BLOGS NETWORK (Jan. 2012), http://lawprofessors.typepad.com/.a/6a00d8341bfae553ef01bb0895d37f970d-pi.

the hiking trail around the lake that I had read about online—but she looked at me blankly. There is no trail around the lake, she insisted, and she had been giving tours here for five years. I would later confirm that the trail really did exist, but she probably didn't know about it, because most Chinese visitors never use it. It's just not part of what they want from their encounters with wilderness. Perhaps reflecting this sentiment was the adjacent wood-carved sign posted conspicuously along the lakeshore: "Civilization is the Most Beautiful Scenery."[467]

Of course, this is a generalization from which there are countless exceptions, and I was the fortunate beneficiary of wisdom from many Chinese friends who introduced me to the remarkable features of the Fushan and Laoshan mountain landscapes in Qingdao. Still, I was surprised to discover the more general indifference to wilderness experiences time and again while traveling the country. Most of the time, the only information I could find about local trails came from foreign tourists and the website instructions they left behind. My family once roamed the southwestern-most part of the country bordering Myanmar (Burma) for days, despairing for a simple walk into the surrounding rainforest. We were repeatedly told by our professional Chinese guides—hired through local contacts by a Chinese student who accompanied us—that what we were asking for was impossible, that there simply were no trails. But on our last day, we met a young pair of traveling Germans who directed us to an expat coffeehouse run by a Frenchman, who showered us with maps of exquisite routes that it was then too late for us to attempt.

Learning from that mistake, I later used the Internet to research a spectacular trail alongside a majestic mountain pass in northern Yunnan Province, at around 9,000 feet along the upper reaches of the Yangtze River, near the border with Tibet. Although I downloaded a map of the trail and brought it with me, our local Chinese guide genuinely knew nothing about it. I finally found a guesthouse whose operators knew of the nearby trail, though they warned that only sheepherders and Western tourists used it. They were right, even though the incredible trail lay at the foot of the Jade Snow Dragon Mountain and within the Tiger Leaping Gorge of the Yangtze,[468] some of China's most heavily domestically-touristed areas. As long as I live, I will never forget that hike. But as far as I can tell, most visiting Chinese will never take it.

I once took some environmental law students on a modest hike in a river canyon—the first time in their lives they had ever gone "hiking." Managing unsecure footing down a dirt trail turned out to be a challengingly unfamiliar physical skill, and even the word was confusing to translate. The closest Chinese

[467] *See* Erin Ryan, *Civilization is the Most Beautiful Scenery*, L. PROFESSOR BLOGS NETWORK (February, 2012), http://lawprofessors.typepad.com/.a/6a00d8341bfae553ef017c31d2f557970b-pi.

[468] *See generally Tiger Leaping Gorge on the Yangtze River*, FAMOUS WONDERS, http://famouswonders.com/tiger-leaping-gorge-on-the-yangtze-river-2/ (last visited Dec. 1, 2016).

word would be "*pa-shan*," which means to climb a mountain. But in China, most mountains are climbed on paved trails and stone staircases. In fact, it's hard to find a mountain of repute that is not adorned with a stone staircase from base to summit.[469] When I first arrived in Qingdao, I was delighted to discover that the little Fushan mountain behind our neighborhood did not have one. But in an effort to improve public enjoyment, local workers later began hauling concrete slabs up its steep flanks with tiny bulldozers, and by the time I left, it too could be summited in heels and flip-flops. This saddened a few Western language teachers in the area, but our Chinese neighbors were mostly happy to see the progress.

As an American environmentalist in China, it was hard to separate myself from my own cultural bias in favor of unmediated wilderness. I longed for earthen trails, and not for piped-in music. Nevertheless, it was impossible to deny the accomplishment of the ancient parting of the Minjiang River at Dujiangyan, saving countless people from the misery of annual flooding while saving countless others from starvation through irrigation. Mountain staircases enable young and old Chinese to climb them in good health, without fear of breaking an ankle or a hip on a rugged trail. And these staircases often lead to spectacular temples and contemplative pagodas nestled among the hills, a classical and undeniably beautiful feature of traditional Chinese culture.

IX. SUSTAINABILITY AND STEWARDSHIP IN MODERN CHINA

This Part continues the existential inquiry of the previous one by considering how different American and Chinese sensibilities lead to distinct challenges for environmental governance. Part VIII began by acknowledging how exquisitely careful one must be in discussing cultural differences—a set of qualifications about the unavoidably ethnocentric nature of my observations that are worth revisiting before beginning this next essay as well.[470] The previous essay then probed how diverging Chinese and American environmental perspectives are informed by different baselines in our cultural relationships with the natural world. This essay explores the confluence of economic and philosophical factors in American and Chinese approaches to sustainability and stewardship obligations. While both countries are in hot pursuit of effective environmental policies, markedly different obstacles stand in their way, some informed by age old philosophical traditions.

[469] *See, e.g.*, Erin Ryan, *Staircase at Laoshan*, L. PROFESSOR BLOGS NETWORK (November, 2011), http://lawprofessors.typepad.com/.a/6a00d8341bfae553ef01b8d17b6ef7970c-pi.

[470] *See supra* Part VIII(A).

A. Obstacles for Sustainability Governance in the U.S.

Both the United States and China are actively developing policies to protect the environment from short-sighted degradation and to channel economic development in more sustainable directions, but each faces different obstacles. Consider our shared goal of creating sustainable environmental governance, to protect global climate and other fragile environmental resources. On some fronts—such as steps taken toward national carbon markets and investment in renewable resource development—China is vastly outperforming the U.S.[471] The contrast has grown even more stark since the marked shifts in American environmental policy in 2017, when the incoming Trump Administration began reversing many environmental policies and regulations of the previous Obama Administration. [472]

For example, when I returned from my Fulbright year in 2012, China had been building roughly one new coal-fired power plant per week,[473] while the U.S. EPA under President Obama was preparing to curb coal-fired power plant pollution under regulations that would become the (erstwhile) Clean Power Plan.[474] Today, China has become the world leader on renewable energy development, while President Trump's administration has announced plans to repeal the Clean Power Plan entirely.[475] In 2017, President Trump pulled the United States out of the landmark Paris climate accord that Presidents Obama and Xi Jinping had helped negotiate in 2015,[476] leaving China slated to become the world leader on combating climate change.[477] Indeed, with Syria's

[471] *See supra* notes 260–265 and accompanying text.

[472] Nadja Popovich, Livia Albeck-Ripka & Kendra Pierre-Louis, *Sixty-seven Environmental Rules on the Way Out Under Trump*, N.Y. TIMES (Jan. 31, 2018), https://www.nytimes.com/interactive/2017/10/05/climate/trump-environment-rules-reversed.html?action=click&module=MoreInSection&pgtype=Article&region=Footer&contentCollection=Climate%20and%20Environment.

[473] *See, e.g.*, *China to Build Fifty Coal Gasification Facilities*, INST. FOR ENERGY RES. (Aug. 6, 2014), http://www.instituteforenergyresearch.org/analysis/china-build-50-coal-gasification-facilities/ (reporting that in 2010 China was "building new power plants weekly to meet their growing energy demand"); Timothy Hurst, *China's Massive Coal-Fired Power Plant Boom Visualized*, ECOPOLITOLOGY (Aug. 26, 2010), https://web.archive.org/web/20160405140738/http://ecopolitology.org/2010/08/26/chinas-massive-coal-fired-power-plant-boom-visualized/ (noting that China is completing the construction of new coal-fired power plants at a rate of 2-3 per week).

[474] The Clean Power Plan, promulgated in December of 2015, was stayed in February of 2016 pending legal challenge. *Clean Power Plan for Existing Power Plants: Regulatory Actions,* U.S. ENVTL. PROTECTION AGENCY, https://archive.epa.gov/epa/cleanpowerplan/clean-power-plan-existing-power-plants-regulatory-actions.html (last updated May 9, 2017).

[475] Lisa Friedman & Brad Plumer, *E.P.A. Announces Repeal of Major Obama-Era Carbon Emissions Rule*, N.Y. TIMES (Oct. 9, 2017), https://www.nytimes.com/2017/10/09/climate/clean-power-plan.html.

[476] Michael Shear, *Trump Will Withdraw U.S. From Paris Climate Agreement*, N.Y. TIMES (June 1, 2017), https://www.nytimes.com/2017/06/01/climate/trump-paris-climate-agreement.html.

[477] Justin Worland, *It Didn't Take Long for China to Fill America's Shoes on Climate Change*, TIME (June 8, 2017), http://time.com/4810846/china-energy-climate-change-paris-agreement/

acceptance of the Paris Agreement in November of 2017, the United States became the only nation on earth that is not a signatory.[478]

Yet even as President Xi assumes a mantle of leadership on climate governance, China continues to wrestle with other elements of good environmental governance.[479] Simultaneously, even as President Trump trumpets an anti-regulatory environmental agenda for his new administration,[480] the American system remains stymied by different forms of governance paralysis (including the literal paralysis of recurring government shut-downs,[481] a phenomenon utterly unimaginable under China's one-party rule).[482] Indeed, when it comes to sustainability policymaking and implementation, the two nations face intriguingly contrasting challenges.

In the United States, the biggest challenge is actually making policy. For example, sustainable climate policymaking has been hampered by the fact that the U.S. has been unable to forge a national consensus that a problem worth solving even exists, let alone consensus on what to do about it.[483] Part of the American failure to move forward on climate governance reflects our state of deep ideological divide, even when a president strongly in favor of climate governance is in office.[484] In recent years, partisan gridlock over environmental policymaking, as well as other realms, has led to record low approval ratings for

(noting that after President Trump's decision to pull out of the Paris Agreement, China has replaced the U.S. as a leader on climate change).

478 Robinson Meyer, *Syria is Joining the Paris Agreement. Now What?*, ATLANTIC (Nov. 8, 2017), https://www.theatlantic.com/science/archive/2017/11/syria-is-joining-the-paris-agreement-now-what/545261/ (reporting that the United States is the only country to reject the Paris Agreement on climate change).

479 See *supra* Parts III–VI (discussing ongoing challenges in Chinese environmental law and enforcement).

480 *See* Popovich et al., *supra* note 472 (listing sixty-seven environmental regulations the Trump Administration plans to repeal).

481 *See* Tara Golshan & Dylan Scot, *The Government Has Officially Shut Down*, VOX (Jan. 22, 2018), https://www.vox.com/policy-and-politics/2018/1/20/16910722/government-shutdown-2018-shut-down (noting that the recent government shutdown was the most recent, and not the first).

482 A government shutdown in China also seems unimaginable because of the powerful nature of the relationship between the government and the people. From imperial times forward, the government—the state—has been virtually synonymous with China itself, and a primary source of both national identity and personal obligation. According to the Chinese perspective explained to me, the state does not exist to serve individuals; rather, individuals exist in service to the state, whether it is the Emperor or the CCP. For that reason, shutting down the government would be like shutting down China, a thing both undesirable and unimaginable for most Chinese.

483 *See, e.g.*, Ian Johnston, *Officials in US Replace Science with Climate Change Denial Days After Donald Trump's Election Victory*, INDEP. (Jan. 3, 2017), http://www.independent.co.uk/news/world/americas/climate-change-denial-us-officials-wisconsin-donald-trump-presidential-election-victory-global-a7506831.html.

484 *See* Art Swift, *Americans Again Pick Environment Over Economic Growth*, GALLUP (Mar. 20, 2014), http://www.gallup.com/poll/168017/americans-again-pick-environment-economic-growth.aspx (showing partisan and generational differences).

Congress,[485] policy votes routinely stalled by the threat of filibusters and other procedural intrigue,[486] and record low productivity on overall lawmaking.[487] The 113th Congress narrowly avoided being labeled the least productive Congress in U.S. history by passing a flurry of bills at the eleventh hour of 2014, but it only narrowly beat out the 112th Congress immediately before it.[488] The extreme political polarization that led to the 2016 election of populist President Donald Trump was predicted to further obstruct lawmaking in the coming years,[489] and for the most part, his first years in office was marked by ongoing legislative gridlock.[490] Our Chinese friends politely marveled at the level of dysfunction in American governance, at times wondering openly why we seemed to think so highly of our democratic system. (And indeed, at times we found it hard to defend.)

While partisan differences are an obstacle to environmental policymaking in the U.S., these efforts are also impeded by widely held ideologies that Americans of all political stripes share. Most Americans affirm strong support for taking care of the earth and the environment,[491] but as in China, Americans who support environmental protection in theory can become less enthusiastic when they perceive the choice as one between environmental protection and

[485] Rebecca Shabad, *Congress' Approval Rating Drops to Eleven Percent*, CBS NEWS (Nov. 11, 2015), http://www.cbsnews.com/news/poll-congress-approval-rating-drops-to-11-percent/ (noting an approval rating of eleven percent in 2015 was just two points higher than the all-time low of nine percent in 2013).

[486] *See* GREGORY KOGER, FILIBUSTERING: A POLITICAL HISTORY OF OBSTRUCTION IN THE HOUSE AND SENATE 6 (2010).

[487] *See* Chris Cillizza, *The Least Productive Congress Ever*, WASH. POST (July 17, 2013), https://www.washingtonpost.com/news/the-fix/wp/2013/07/17/the-least-productive-congress-ever/?utm_term=.1b20d49c8e68.

[488] Mark Murray, *113th Congress Not the Least Productive in Modern History*, NBC NEWS (Dec. 29, 2014), http://www.nbcnews.com/politics/first-read/113th-congress-not-least-productive-modern-history-n276216.

[489] Susan Davis, *Polarization, Lack of Productivity Likely to Reign in Congress After Election*, NAT'L PUB. RADIO (Nov. 4, 2016), http://www.npr.org/2016/11/04/500376980/polarization-and-a-lack-of-productivity-are-likely-to-reign-after-election-day.

[490] The notable exception was Congress's enactment of President Trump's tax reform initiative. As one journalist described, "In his first year in office, President Donald Trump signed 117 bills into law, but few represented major legislative achievements. The passage of a massive Republican tax overhaul law stands as the crowning victory of the Trump agenda's first year. However, the majority of laws were symbolic, expanded upon existing legislation, or aimed at dismantling former President Barack Obama's legislative legacy." Jennifer Hansler, *These Are the Bills Trump Signed into Law in His First Year as President*, CNN (Jan. 20, 2018) https://www.cnn.com/2017/06/29/politics/president-trump-legislation/index.html.

[491] Joanna Piacenza, *On Earth Day, Americans Support Principle of Environmental Protection, but Divided over Policy*, PUB. RELIGION RES. INST. (Apr. 22, 2015), http://www.prri.org/spotlight/on-earth-day-americans-support-environmental-protection-divided-policy/ (reporting that "a soaring majority" (88%) of Americans say that respecting and taking care of the earth is important, a consensus bridging political and religious divides). However, Americans cleave along partisan lines in terms of what they think should be done to protect the environment. *Id.*

their own economic wellbeing.[492] In general, Americans have been unwilling to give up consumption-heavy aspects of their lifestyles, from meat-eating to air conditioning to gas-guzzling automobiles.[493] And across partisan lines, Americans resist the idea of paying more taxes—even though they are low in comparison to comparable developed nations and even when needed to support the environmental initiatives they say they want.[494] For example, many American economists have argued that deploying a national carbon tax would be easier and more efficient than the cap-and-trade proposals that have had more political traction (to the extent that any greenhouse gas regulation has ever had traction in Congress).[495] Yet even when climate policy was a hot topic in Washington, the carbon tax was considered a non-starter, given the popular resistance to taxes that reflects the libertarian streak in the American cultural consciousness.[496]

Similarly, there is widespread cultural regard for free market ideals, on both the left and the right.[497] Americans generally praise the idea of free markets—

[492] *See Section 9: The Environment and the Economy*, PEW RES. CTR. (May 21, 2009), http://www.people-press.org/2009/05/21/section-9-the-environment-and-the-economy/ (showing that support for environmental protection declines when it conflicts with economic interests); Darren K. Carlson, *Public Priorities: Environment vs. Economic Growth*, GALLUP (Apr. 12, 2005), http://www.gallup.com/poll/15820/public-priorities-environment-vs-economic-growth.aspx (showing the overall trend of American preferences for environmental protection over economic goals over time, but noting partisan differences).

[493] *See, e.g.*, Alex Altman, *New Poll Shows Americans Won't Give Up Their Cars*, TIME (July 18, 2014), http://time.com/3005148/energy-cars-driving-gas-poll/ (reporting on a global survey about attitudes toward energy, which revealed that Americans are more reluctant than international counterparts to ditch cars for public transport).

[494] *How Do US Taxes Compare Internationally?*, TAX POL'Y CTR., http://www.taxpolicycenter.org/briefing-book/how-do-us-taxes-compare-internationally (last visited Dec. 1, 2016).

[495] *See, e.g.*, SHI-LING HSU, THE CASE FOR A CARBON TAX: GETTING PAST OUR HANGUPS TO EFFECTIVE CLIMATE POLICY 85-89 (2011) (arguing that it is easier to design an efficient carbon tax than it has been to design an efficient cap-and-trade policy); William A. Pizer, *Combining Price and Quantity Controls to Mitigate Global Climate Change*, 85 J. PUB. ECON. 409 (2002). *See also* Yoram Bauman & Shi-Ling Hsu, *The Most Sensible Tax of All*, N.Y. TIMES (July 4, 2012), http://www.nytimes.com/2012/07/05/opinion/a-carbon-tax-sensible-for-all.html?_r=1& ("[E]conomists know that a carbon tax swap can reduce the economic drag created by our current tax system and increase long-run growth by nudging the economy away from consumption and borrowing and toward saving and investment.").

[496] *See, e.g.*, Ben Geman, *GOP Leaders Slam the Door on Carbon Taxes*, HILL (July 16, 2012), http://thehill.com/blogs/e2-wire/e2-wire/238111-boehner-mcconnell-slam-door-on-carbon-taxes ("Capitol Hill's most powerful Republicans say advocates who have been discussing a carbon tax behind closed doors are wasting their breath.").

[497] Of course, market ideals aren't universally shared in the U.S., as attested by the Occupy Movement and grassroots opposition on both the left and right to free trade agreements during the 2016 presidential campaign. Jennifer Steinhauer, *Both Parties Used to Back Free Trade. Now they Bash It.*, N.Y. TIMES (July 29, 2016), http://www.nytimes.com/2016/07/30/us/politics/in-time-of-discord-bashing-trade-pacts-appeals-to-both-parties.html. However, the White House has required economic, cost-benefit analysis of all new regulations by the Office of Management and Budget for decades, testifying to the primary role that market analysis maintains in American policymaking. *See*

even if they don't like them in practice, as suggested by the growing resistance on both the left and the right to free trade agreements like the Trans Pacific Partnership.[498] Americans' comfort with market mechanisms is reflected by the (relative) enthusiasm for market-based tools like emissions-trading schemes, wetland mitigation banking, and other alternatives to "command-and-control" environmental regulatory approaches.[499] There has not been sufficient consensus to translate market ideals into actionable climate policy at the national level, but these ideals were circulating widely when the Waxman-Markey cap-and-trade bill passed the House of Representatives in 2009.[500] Nevertheless, free market ideals have long proved more poetic than realistic in operation; after all, there hasn't been a truly free market economy in the U.S. since the rise of post-depression Keynesian economics,[501] and the school of Behavioral Economics has increasingly revealed the ways in which human decisions depart from the assumption of rationality that underlie traditional economic analysis.[502] Moreover, market tools have proven especially clumsy in certain realms of environmental management,[503] where market failures caused by subsidies,

MAEVE P. CAREY, COST-BENEFIT AND OTHER ANALYSIS REQUIREMENTS IN THE RULEMAKING PROCESS (2014), https://fas.org/sgp/crs/misc/R41974.pdf (explaining the role of cost-benefit regulatory analysis by the Office of Management and Budget under Executive Order 12866 and other laws).

[498] *The Trans-Pacific Partnership Weighing Anchor*, ECONOMIST (Oct. 10, 2015), https://www.economist.com/news/finance-and-economics/21672330-negotiators-agree-ambitious-trade-deal-opposition-its-ratification (noting opposition on both the left and right).

[499] *See, e.g.*, David M. Driesen, *Sustainable Development and Market Liberalism's Shotgun Wedding: Emissions Trading Under the Kyoto Protocol*, 83 IND. L. J. 21, 30 (2008) (praising emissions trading as an ingenious means of "correct[ing] the failure of traditional government regulation to generate the cost-effective outcomes hypothesized for an ideal free market"); Dustin J. Edwards, *Wetland Mitigation Banking: Is the Current System Beyond Repair?*, 16 TUL. ENVTL. L. J. 445, 446 (2003) (discussing the popularity of wetlands mitigation banking as a market-based solution for the problem of wetlands loss).

[500] *See generally* MARK HOLT, SUMMARY OF WAXMAN-MARKEY DRAFT GREENHOUSE GAS LEGISLATION (2009), http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R40597.pdf (summarizing provisions of unsuccessful Waxman-Markey legislation, also known as the American Clean Energy and Security Act of 2009, which would have introduced a cap-and-trade system to reduce greenhouse gas emissions).

[501] *See generally* JOHN MAYNARD KEYNES, THE GENERAL THEORY OF EMPLOYMENT, INTEREST, AND MONEY (Kalpaz Publications 2017).

[502] Melissa A. Z. Knoli, *The Role of Behavioral Economics and Behavioral Decision Making in Americans' Retirement Savings Decisions*, SOCIAL SEC. ADMIN. (Nov. 2010), https://www.ssa.gov/policy/docs/ssb/v70n4/v70n4p1.html.

[503] Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553 (2002) (critiquing cost-benefit analysis of environmental protection because (1) the standard economic approaches to valuation are inaccurate and implausible; (2) the use of discounting improperly trivializes future and irreversible environmental harms; (3) aggregating monetized benefits excludes questions of fairness and morality; and (4) the complex process of calculating utility is value-laden, subjective, and non-transparent).

externalities, and public choice problems abound.[504]

Finally, another important hurdle for American environmental policymaking—and one pointedly *not* shared in China—is the skepticism with which increasing numbers of Americans seem to regard science itself[505] (or, as some would characterize it, scientists[506]). Environmental law is uniquely bound up with scientific assessment and research, but Americans seem increasingly unpersuaded by the work of even our own most accomplished scientists.[507] American school boards have spent enormous energy debating questions of how and even whether to allow the teaching of scientific topics that would baffle the average Chinese teacher or parent (such as anthropogenic climate change and evolution),[508] and whether to allow government agencies to conduct scientific research on politically charged issues (such as the public health implications of gun violence).[509] In China, there may be disagreements about the best approach for dealing with pollution, but as a rule, the Chinese accept scientific evidence as a valid basis for policymaking.

B. Obstacles for Sustainability Governance in China

In China, policymaking itself is not usually the obstacle. Indeed, China excels at policy making, with regular Five-Year Plans produced at the national,

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[504] Indeed, many environmental problems resist resolution by market forces because there is, in fact, no operating market. Supply and demand malfunction as regulatory tools in application to breathable air, drinkable water, stable climate, pollination, and other environmental goods that effectively register as "free" (and thus of no actual value) because they are unmediated by the usual market participants of buyers, sellers, and producers. *See, e.g.*, RASBAND, *supra* note 57, at 41-43 (discussing market forces and market failures).

[505] *See, e.g.*, Evan Lehmann, *Conservatives Lose Faith in Science over Last 40 Years*, SCI. AM. (Mar. 30, 2012), https://www.scientificamerican.com/article/conservatives-lose-faith-in-science-over-last-40-years/ (citing that political conservatives' trust in the scientific community has dropped twenty-five percent since 1974).

[506] *See* Glenn H, Reynolds, *Faith in Science?*, N.Y. POST (Apr. 2, 2012), http://www.nypost.com/p/news/opinion/opedcolumnists/faith_in_science_ElyzoJm9wNW7Vl7m8ESXYP (noting that skepticism of the scientific community is directed toward people running institutions rather than science itself).

[507] *See generally* ANDREW DESSLER & EDWARD A. PARSON, THE SCIENCE AND POLITICS OF GLOBAL CLIMATE CHANGE: A GUIDE TO THE DEBATE (2d ed. 2010) (discussing the intersection of climate science, policy, and politics).

[508] *See, e.g.*, Devin Powell, *See Where Climate Science Conflict Has Invaded U.S. Classrooms*, SMITHSONIAN (Sept. 23, 2015), http://www.smithsonianmag.com/science-nature/see-where-climate-science-conflict-has-invaded-us-classrooms-180956707/?no-ist; Michelle Harven, *For First Time, Alabama Schools Required to Teach Climate Change, Evolution*, PBS NEWS HOUR (Sept. 15, 2015), http://www.pbs.org/newshour/rundown/alabama-officials-unanimously-decide-textbooks-must-teach-climate-change-evolution/.

[509] Robert Preidt, *Gun Violence Research Ban Must Be Lifted, Say Doctors*, CBS NEWS (June 15, 2016), http://www.cbsnews.com/news/gun-violence-research-ban-must-be-lifted-american-medical-association/.

provincial, and every local level.[510] The Five-Year Plans are designed to address all conceivable regulatory challenges with detailed programmatic plans—and even some that might not strike Americans as the usual subjects of regulation at all, such as birth rates or targeted numbers of Ph.D. students in different fields.[511] Neither does China struggle with the classic American problem of forging a national consensus, because national consensus occurs by design in the one-party, top-down system of Chinese governance. China has also proved willing to experiment with both fully centralized planning, full market mechanisms, and new combinations of both. As Deng Xiaoping famously said, "It doesn't matter whether the cat is black or white, as long as it catches mice."[512] At least in comparison to the United States, China also has a much more uniformly peaceable relationship with science.[513]

Because the Chinese system is not transparent, it is difficult to evaluate the policymaking process in the same way that enables easy diagnosis of problems with the U.S. system. Although we can identify the environmental and economic challenges confronting policymakers, it's hard to know with certainty the systematic obstacles those policymakers face. To that end, a popular analogy describing Party politics is that of the duck on a lake: the bird glides gracefully and seemingly effortlessly along the surface, while unseen, it paddles furiously underneath—coping with the currents of internal contests for influence and direction.[514] While there is no direct Chinese analog to the partisan gridlock that hampers the American legislative process, experts on Chinese governance describe power struggles within Party leadership, in which different factions support different leaders and approaches to balancing environmental and economic progress.[515] Indeed, President Xi Jinping consolidated his faction's

[510] Dan Guttman, *Different Operating Systems*, 25 ENVTL. F. 27 (Nov./Dec. 2008) (contrasting the executive policy-based legal system in China with the legislative statute-based legal system in the U.S.).

[511] *See, e.g.*, Li Peng, *Report on the Outline of the Ninth Five-Year Plan (1996-2000) for National Economic and Social Development and the Long-range Objectives to the Year 2010 (Excerpts)*, CHINA INTERNET INFO. CTR. (Mar. 5, 1996), http://www.china.org.cn/95e/95-english1/2.htm (setting forth official policy on accelerating the development of science and technology and controlling population growth). *See also* Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 205-06 (discussing the Five-Year Plans).

[512] Wen Liao, *China's Black Cat, White Cat Diplomacy*, FOREIGN POL'Y (July 10, 2009), http://foreignpolicy.com/2009/07/10/chinas-black-cat-white-cat-diplomacy/ ("Deng Xiaoping famously said that it doesn't matter if a cat is black or white so long as it catches mice").

[513] *See supra* note 508–509 and accompanying text (discussing the fraught subject of science education in the United States).

[514] The American system can also be comically analogized to the duck on the lake, but with a twist: here, the duck dives its head below water, paddling furiously but moving nowhere, with the machinations of its uselessly struggling legs openly visible to all.

[515] *See* Kerry Brown, *The Power Struggle Among China's Elite*, FOREIGN POL'Y (Oct. 14, 2010), http://foreignpolicy.com/2010/10/14/the-power-struggle-among-chinas-elite/ ("The Communist Party is certainly nobody's idea of a democratic institution, but it has plenty of divisions — and not just between left and right, liberal and conservative, traditional and modernist. It has

power in 2018, successfully arranging for a constitutional amendment that removed term limits and effectively places him at the helm of China's government for life (and in doing so, may have created a new set of governance challenges).[516]

In contrast to American difficulties, then, the obstacles in China generally have less to do with successful policymaking and more to do with ground-level implementation and enforcement, as described in Part VI. In recent decades, China produced carefully penned, ambitious environmental laws and regulatory goals.[517] But even as these laws ramped up to meet their increasingly daunting task, implementation was hampered by ongoing competition between environmental and economic targets, understaffed enforcement agencies, and the pervasive networks of corruption and political patronage that too often shield polluters from liability.[518] As noted in Part VI, translating centrally formulated mandates into locally implemented policies has been the most formidable challenge for Chinese environmental law,[519] although new substantive and procedural reforms suggest that this pattern is changing.[520] I won't repeat that discussion here, but I will add one more problem that, while less immediately obvious, may prove the more stubborn issue in the long term: the problem of public indifference.

Widespread public indifference to environmental goals is a problem that both countries share in different respects. Americans have failed to generate sufficient public momentum to combat climate change, and public vigilance about other forms of pollution may be waning precisely because environmental regulation has dealt so successfully with the alarming levels of the past.[521]

different kinds of elites and business interests, and different leadership dynamics depending on whether one is looking at the party in the capital or the provinces.").

[516] Stephen McDonnell, *China's Xi Allowed to Remain 'President For Life' As Term Limits Removed*, BBC NEWS (Mar. 11, 2018), www.bbc.com/news/world-asia-china-43361276 (noting that Chairman Xi "has amassed power the likes of which has not been seen since Chairman Mao Zedong").

[517] *See* Ryan, *Elaborate Paper Tiger*, *supra* note 2, at 237–39.

[518] *Id.*; *see also supra* Part IV.

[519] *See generally* Ryan, *Elaborate Paper Tiger*, *supra* note 2; *see also* William P. Alford et al., *The Human Dimensions of Pollution Policy Implementation: Air Quality in Rural China*, 11 J. CONTEMP. CHINA 32 (2002), http://wcfia.harvard.edu/files/wcfia/files/677_anqing_final.pdf (discussing the need for education in rural areas in order to achieve effective implementation of environmental policies).

[520] *See supra* notes 148–153 and accompanying text (discussing new substantive environmental reforms) and notes 162-168 and accompanying text (discussing new procedural environmental reforms).

[521] *Cf.* Jeffrey M. Jones, *In U.S., Concern About Environmental Threats Eases*, GALLUP (Mar. 25, 2015), http://www.gallup.com/poll/182105/concern-environmental-threats-eases.aspx?g_source=ENVIRONMENT&g_medium=topic&g_campaign=tiles (noting that Americans have become less worried about environmental threats as they perceive the environment to be in relatively good shape). *See also No American Should Take the Clean Water Act for Granted*, OUTDOOR NEWS (Oct. 31, 2012), http://www.outdoornews.com/2012/10/31/no-american-should-take-the-clean-water

Americans claim to care deeply about the environment,[522] as they have ever since the environmental movement of the 1970s, and on the whole, they seem to know something about which of their personal behaviors can help or hurt the environment. The problem for Americans is that, while most know what they should be doing, they have made uneven progress in doing it. Younger Americans are more likely to make daily personal sacrifices to protect the environment, indicating at least hope for progress in the future.[523]

In China, public concern over environmental regulation is on the opposite trajectory, increasing with the growing obviousness of pollution in China. Awe-inspiring investments in renewable energy production have been announced, and China now boasts many features of urban sustainability infrastructure that the U.S. would do well to emulate.[524] As noted in Part V, solar water heaters abound, although possibly because they are relatively inexpensive (and in some cases, mandatory).[525] Buses, taxis and other municipal fleets increasingly run on publicly incentivized natural gas.[526] Public transportation is well-developed in comparison to many American cities,[527] though it is assisted by the fact that Chinese people are just beginning to afford cars (and indeed, unprecedented traffic has developed as China's emerging middle class gets behind their own wheels).[528] These infrastructural accomplishments showcase the success of

%E2%80%88act-for-granted/ (arguing that the success of environmental laws cannot become the basis for the rollback of the same laws).

[522] Monica Anderson, *For Earth Day, Here's How Americans View Environmental Issues*, PEW RES. CTR. (Apr. 20, 2017), www.pewresearch.org/fact-tank/2017/04/20/for-earth-day-heres-how-americans-view-environmental-issues/ ("[A]bout three-quarters of U.S. adults (74%) said 'the country should do whatever it takes to protect the environment,' compared with 23% who said 'the country has gone too far in its efforts to protect the environment.'").

[523] Art Swift, *Americans Again Pick Environment Over Economic Growth*, GALLUP (Mar. 20, 2014), http://www.gallup.com/poll/168017/americans-again-pick-environment-economic-growth.aspx; S. C. JOHNSON, THE ENVIRONMENT: PUBLIC ATTITUDES AND INDIVIDUAL BEHAVIOR—A TWENTY-YEAR EVOLUTION (2011), http://www.scjohnson.com/Libraries/Download_Documents/SCJ_and_GfK_Roper_Green_Gauge.sflb.ashx.

[524] *See supra* notes 260–279 and accompanying text; *see also* Helen Davidson, *China on Track to Lead in Renewables as US Retreats, Report Says*, GUARDIAN (Jan. 9, 2018), https://www.theguardian.com/environment/2018/jan/10/china-on-track-to-lead-in-renewables-as-us-retreats-report-says (noting that China is the world's largest investor in both domestic and international renewable energy development).

[525] *Case Study: An Extensive Solar Program in China*, C40 CITIES (Nov. 9, 2011), http://www.c40.org/case_studies/an-extensive-solar-program-in-china (describing a municipal government retrofit program that required all buildings to install solar water heaters).

[526] Jack Perkowsi, *Natural Gas Vehicles in China*, FORBES (Apr. 13, 2012), http://www.forbes.com/sites/jackperkowski/2012/04/13/natural-gas-vehicles-in-china/ (estimating that half of all taxis in China have adopted natural gas engines, and that stricter emission regulations will likely increase demand).

[527] *See supra* notes 278–279 and accompanying text.

[528] Wang Xiaodong, *Traffic Woes Increase on Urban Area Roads*, CHINA DAILY (Apr. 7, 2015), http://www.chinadaily.com.cn/china/2015-04/07/content_20010780.htm (reporting on chronic traffic congestion as new vehicles outpace transportation infrastructure).

Chinese policymaking notwithstanding the challenges of implementation.

However, it's important to note that most of these successes are the result of regulatory mandates, or accompanied by some sort of economic incentives. The government is now promoting sustainable policies, but most citizens haven't yet internalized the relationship between their personal behavior and environmental wellbeing. Even as public attention shifts toward the harms of industrial pollution, recognition of the personal role in environmental sustainability lies nascent. Whereas the average American probably knows what she "should" do to protect the environment but chooses otherwise (sometimes for economic reasons, but too often, sheer laziness), the average Chinese person may not even know much about the causal relationship between his personal choices and the environment. For example, as noted in Part VII, my environmental law students were unfamiliar with recycling, and well-to-do Beijing residents proved uninterested, despite an army of municipal workers trying to engage them.[529]

The cultural foundations that would support the fuller environmental movements that have taken root in other cultures, east and west, are only just beginning to materialize in China. As a result, and as was true in the U.S. until a few decades ago, one does not see a lot of conservation-oriented behavior by average citizens, at least not without an immediate economic incentive or legal requirement. Where these incentives for conservation end, so too does general public compliance[530]—and at least for now, this appears to be so without regard to the kinds of generational, partisan, or educational dividing-lines that often accompany diverging conservation habits among Americans.[531] Chinese people want to be free of the health impacts of increasing pollution, but sustainability ideals beyond that mostly resonate for economic reasons, if they resonate at all.

To be fair, sustainability goes far beyond recycling, and China's leadership in developing renewable energy will more than make up for its lackluster recycling in terms of impact on the global environment. In addition to its commitment to renewables, China has recently launched other significant sustainability policies, including its new ban on importation of elephant ivory.[532] I come back to

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[529] *Beijing Struggles to Get Residents to Declare War on Trash*, *supra* note 386, and accompanying text.

[530] *Cf.* David J Pannell, *Public Benefits, Private Benefits, and Policy Intervention for Land-Use Change for Environmental Benefits*, 84(2) LAND ECON. 225, 240 (2008) ("This framework reveals that the selection of cost-effective environmental projects is perhaps even more sensitive to private net benefits than to public net benefits").

[531] *See generally* Frank Newport, *Nearly Half in U.S. Say Gov't Environmental Efforts Lacking*, GALLUP (Apr. 1, 2013), http://www.gallup.com/poll/161579/nearly-half-say-gov-environmental-efforts-lacking.aspx; Andrew Dugan, *Americans Choose the Environment Over Energy Development*, GALLUP (Apr. 13, 2015), http://www.gallup.com/poll/182402/americans-choose-environment-energy-development.aspx?g_source=ENVIRONMENT&g_medium=topic&g_campaign=tiles.

[532] *China Ban on Ivory Sales Begins Sunday, Aims to Curb Elephant Poaching*, REUTERS (Dec. 28, 2017), https://www.reuters.com/article/us-china-ivory/china-ban-on-ivory-sales-begins-sunday-

recycling and consumerism because, in contrast to top-down mandates like the ivory ban and Five-Year Plan renewables targets, recycling and consumerism habits provide an accessible index of personal attitudes among the general public. And there, it's clear that recycling has yet to emerge as a societal norm, even as consumption patterns balloon and overflowing landfills become yet another threat to public health.[533]

Other important realms of sustainability practice remain unfulfilled in both China and the United States, where homes are also over-heated and under-insulated, engines over-polluting, fertilizers and pesticides overused, and products over-packaged. With several decades of environmental headstart, many of these problems have received more regulatory attention in the U.S.—although there are still many miles to go before Americans should sleep soundly on these matters,[534] especially as we begin rolling many of those regulations back.[535] The critical difference is that, at least for now, fewer Chinese even know that these problems should be keeping them awake at night.

Recognizing this problem, the Chinese government itself is undertaking a remarkable effort to inculcate sustainability values among the *lao baixing* ("100 surnames," or ordinary people) with a campaign to usher China toward the "Circular Economy," sometimes translated as "Recycling Economy." An idealized vision of sustainability in all aspects of commercial and private life, the Circular Economy represents the Chinese version of "reduce, reuse, and recycle" writ large.[536] It encourages all citizens to see the relationship between their everyday behaviors and environmental wellbeing, buttressed by a national law that exhorts sustainable practices by local government and the businesses community.[537] The government adorns public spaces with signs reminding

aims-to-curb-elephant-poaching-idUSKBN1EN0I5 (reporting that China, the world's largest importer and end user of elephant tusks, has instituted a national ban on ivory sales that wildlife activists are hailing as "the greatest single step toward reducing elephant poaching" and protecting the species from extinction).

533 *See supra* Part VI.

534 *See, e.g.*, RICHARD LAZARUS, THE MAKING OF ENVIRONMENTAL LAW 209–35 (2006).

535 *See* Popovich et al., *supra* note 472 (listing sixty-seven environmental regulations the Trump Administration plans to repeal).

536 *See*, *e.g.*, *China Adopts Law to Promote Circular Economy*, CHINA DAILY (Aug. 30, 2008), http://www.chinadaily.com.cn/business/2008-08/30/content_6983490.htm; Chen Jia, *Society Asked to Treat Rubbish as Resource*, CHINA DAILY (May 12, 2010), http://www.chinadaily.com.cn/china/2010-05/12/content_9837139.htm (describing Beijing efforts to create community recycling stations as part of "Renewable Resource Recycling Day").

537 *E.g.*, Charlie McElwee, *China Adopts Circular Economy Law*, CHINA ENVTL. L (Aug. 30, 2008), https://web.archive.org/web/20150720213050/http://www.chinaenvironmentallaw.com/2008/08/30/china-adopts-circular-economy-law/ (summarizing the various requirements of the law, including government monitoring of energy consumption and pollution emissions and the development of policies to promote recycling, create environmentally friendly industries, introduce water-saving technologies, adopt renewable products in new buildings, and favor clean energy over fossil fuel production). *See also* Circular Economy Promotion Law of the People's Republic of China (Aug. 29, 2008), www.fdi.gov.cn/1800000121_39_597_0_7.html (English translation).

people that "environmental protection is everyone's responsibility."[538] Even the Tsingtao Beer Brewery & Museum includes a full exhibit on sustainability (including a full exposition of Rachel Carson's *Silent Spring*), notwithstanding its weak connection with the general subject matter of the museum.[539]

It's a good thing that Chinese leaders are beginning to take sustainability seriously, because there is important work to be done at all levels, including consciousness-raising. Awareness of wider sustainability issues will certainly grow with rising public consciousness about the human health effects of air, water, and landfill pollution. Notably, these are the same kinds of concerns that jumpstarted the American environmental movement in the 1970s, resulting in the groundbreaking passage of major environmental statutes, like the Clean Air and Water Acts. The wider environmental movement that has followed inspired an ethic of personal responsibility worldwide, urging each of us to "think globally and act locally" in doing our part to protect the Earth.[540] In today's China, the combined force of public outcry and responsive legal reforms show a nation ripe for its own environmental awakening. But when it comes to personal responsibility for sustainability, just as America must find a way to inspire action, China must find a way to inspire interest.

C. Stewardship and Ancient Chinese Philosophy

Here is a radical thought, but could China's struggles with environmental governance include a philosophical component? Indifference to sustainability goals surely reflects pressure for ongoing economic development, especially in rural China. But in wealthier urban areas, could the relative indifference noted above be related to something more—perhaps, a cultural difference with regard to perceived stewardship obligations? I pause once again to acknowledge that of all places I have threatened to overstep as a cultural outsider, this one is the most perilous.[541] But in the hope that an outsider sometimes yields unique perspective, I offer this parting reflection.

I came to China with my own set of preconceptions about what I would find

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[538] For an example from May Fourth Square in downtown Qingdao, *see* Erin Ryan, *Environment Protection is Everybody's Responsibility*, L. PROFESSOR BLOGS NETWORK (Sept. 2011), http://lawprofessors.typepad.com/.a/6a00d8341bfae553ef017c33439650970b-pi.

[539] *See* Erin Ryan, *Silent Spring at Tsingtao Brewery*, L. PROFESSOR BLOGS NETWORK (Mar. 2012), http://lawprofessors.typepad.com/.a/6a00d8341bfae553ef016303d01e15970d-pi. Skeptics allege that the Tsingtao Brewery's sustainability exhibit is mere window-dressing, designed mostly to impress the foreign tourists that visit the brewery. That said, an awful lot of domestic tourists visit as well.

[540] *René Dubos Biography*, BIOGRAPHY.COM, http://www.biography.com/people/ren%C3%A9-dubos-39618#synopsis (last updated Apr. 1, 2004) (attributing the phrase to the famous French biologist and environmental advocate who served as an advisor to the 1972 United Nations Conference on the Human Environment).

[541] *See supra*, the final paragraph of Part II(F) and Part VIII(A).

there. I majored in Chinese language and culture and had studied Chinese philosophy as an undergraduate. In fact, I had started out as a Philosophy major and then switched in my third year to study the Eastern traditions that would not count for credit in my initial department. I locked myself in a language lab to graduate on time, but it was worth it to study the amazing story of China, its culture, history, and philosophical traditions. I was curious about how the principles of Confucianism helped order society, and how Indian Buddhism had infused Chinese traditions with the additional quest for wisdom and enlightenment. I was especially enchanted with the Naturalist School of Taoism, emphasizing a harmony between the human and natural worlds that resonated with my own Western-environmentalist sensibilities.

I was thus very excited when my Fulbright placed me in Shandong province, the historic home of Confucius and site of many renowned Taoist temples.[542] I knew that China faced daunting environmental challenges, and on some subconscious level—likely reflecting my own values more than anything else—I suppose I hoped to discover how China could draw on its own Taoist principles for cultural support in resolving them. But the Taoism I found in China held little in common with the version I had studied in college, with its emphasis on personal adherence to the Way (or "Tao") of living in harmony with nature and all things. In China, the Taoist temples I visited appeared to emphasize faithful worship of colorful immortals over the Tao itself—at least so far as I could tell, and so far as my Chinese hosts could explain it to me. While visiting Buddhist and Taoist temples with accompanying students, I found that they were generally unable to even articulate the differences between Buddhism and Taoism at all.

Granted, I might have had a very different experience talking with an actual Taoist or Buddhist monk, and I'm sure the stylized versions I had learned at Harvard didn't accurately portray the reality of Chinese experience. Either way, what I learned from my adventures in 2012 is that most mainland Chinese weren't paying much attention to either Taoism or Buddhism these days, seeing them as quaint at best, and culturally backward at worst. These ancient philosophies were strongly discouraged during the Cultural Revolution of the 1960s,[543] successfully enough that they no longer seem to play an important role in the philosophical worlds of most modern Chinese. Falun Gong, a hybrid of Buddhist, Taoist, and other principles of compassion[544] commands more

[542] *See* Jeffrey Hays, *Shandong Province (Qufu, Confucius, Taishan, Qingdao)*, FACTS & DETAILS, http://factsanddetails.com/china/cat15/sub97/item466.html (last visited Dec. 1, 2016) (noting that Qufu, a city in Shandong province, is the hometown of Confucius).

[543] *See* Jiping Zuo, *Political Religion: The Case of the Cultural Revolution in China*, 51 SOC. ANALYSIS 99, 101 (1991) ("The attack on religion was intensified during the Cultural Revolution, which began with the elimination of the 'Four Olds' (old ideas, old values, old customs, and old traditions).").

[544] *See* BENJAMIN PENNY, THE RELIGION OF FALUN GONG 173 (2012).

attention in popular consciousness, as has Christianity in some circles,[545] but Falun Gong has been banned as a cult, and organized religion is generally discouraged by the government.[546]

Nevertheless, while Buddhism and Taoism have mostly faded from daily life (or been subsumed in ways that make them less recognizable as distinctive schools of thought), the philosophy of Confucianism remains steadfast. Confucianism continues to play a foundational role in modern China, providing a strong ethic of righteous living and conduct in relationships that redounds throughout Chinese culture.[547]

Founded on the teachings of the ancient philosopher Confucius, Confucianism focuses on the cultivation of personal virtue, emphasizing respect for others and for proper roles within the community.[548] Among its humanist principles, Confucianism emphasizes the importance of education, reverence for the ancestors, and the critical responsibilities of individuals within local and familial hierarchies.[549] And while the Cultural Revolution was successful in eradicating Taoism and Buddhism from the Chinese popular conscience, the Confucian bedrock of Chinese society survived intact—probably because the current political system itself is organically grown of Confucian principles.[550] Insert the

[545] James Griffiths, *Why China Fears the Falun Gong*, L. A. DAILY NEWS (July 14, 2014), http://www.dailynews.com/general-news/20140714/why-china-fears-the-falun-gong.

[546] *Id*.

[547] *See, e.g.*, DING WANGDAO, UNDERSTANDING CONFUCIUS 213 (1997) (discussing Confucianism's "incomparably extensive, profound, and lasting influence on Chinese society").

[548] *See generally* DING WANGDAO, *supra* note 547; *see also* Karyn L. Lai, *Confucian Moral Thinking*, 45 PHIL. E. & W. 251 (citing *Analects* 4:5.2, Confucius said that a Confucian gentleman "without virtue cannot fulfill the requirements of that name"); J. W. Freiberg, *The Dialectic of Confucianism and Taoism in Ancient China*, 2 DIALECTICAL ANTHROPOLOGY 175, 187 (1977) ("The laying of the foundation of (all) love in the love of the parents teaches people concord. The laying of the foundation of (all) reverence in the reverence of elders teaches the people obedience. When taught loving harmony, the people set the (proper) value on their parents; when taught to reverence their superiors, the people set the (proper) value in obeying the orders given to them." (quoting JAMES LEGGE, CONFUCIAN ANALECTS, THE GREAT LEANING, AND THE DOCTRINE OF THE MEAN 217 (1971)).

[549] *See generally* DING WANGDAO, *supra* note 547; *see also* JOHN BRYAN STARR, UNDERSTANDING CHINA: A GUIDE TO CHINA'S CULTURE, ECONOMY, AND POLITICAL STRUCTURE 43–44 (1997) (discussing the reciprocal relationships between father and son, where the son is responsible for obeying his father and the father is responsible to teach his son moral behavior by example, and noting "Confucius then applied this model of reciprocity to other relationships within and outside the family"); MIRA BARTÓK & CHRISTINE RONAN, ANCIENT CHINA 6, (1995) ("Confucius taught that, above all, one should serve and honor one's parents, family and ancestors."); Freiberg, *supra* note 548, at 187 (discussing the hierarchical model of Confucian ethics, in which "just as wife, first-son, later sons and daughters find their natural order through submission to the father, so must all in the land bow before the [emperor]," and as "younger brother shows respect for his elder brother, so the lower classes must respect the ruling classes").

[550] *Cf.* JINGHAO ZHOU, REMAKING CHINA'S PUBLIC PHILOSOPHY FOR THE TWENTY-FIRST CENTURY 70 (2003) (discussing how "[r]ulemaking China's public philosophy will be a long process because the roots of Confucian culture and politics run very deep.").

ruling Communist Party in the role formerly held by the Imperial family, and the rest of the traditional Chinese social order remains surprisingly familiar.

Indeed, Confucian ethics are among the proudest cultural traditions of China, and they form the backbone of many other Asian cultures, including Korea, Japan, and Vietnam.[551] They infuse the flavor and texture of Chinese society, gracing it with respectful behavior, deep regard for the wisdom of elders, societal support for teachers, and reverence for education in general.[552] They also emphasize the proper behavior of individuals according to their roles within the social order.[553] Children should obey parents, wives should obey husbands, and husbands should obey local leaders, who should, in turn, obey national leaders.[554] This system of ordered relationships has conferred social stability during times of great cultural upheaval, reaching back over thousands of years of conquest and dynastic change.

The strength of Confucian ideals helps explain the extraordinary stability and continuity of a culture as old and expansive as China's, notwithstanding such destabilizing modern events as the Communist Revolution of 1949 and the Cultural Revolution of the 1960s.[555] Yet even as the great tradition of Confucianism exhorts right behavior within the social order, I could not help but wonder about the relationship between Confucian principles and environmental ethics. As noted above, a pithy maxim of modern environmental ethics, popularized by an advisor to the 1972 United Nations Conference on the Human Environment,[556] admonishes us to "Think Globally, Act Locally." Confucianism teaches people to behave admirably in all situations. But if an important part of that lesson is to focus on one's own sphere of responsibility and defer to higher-ups beyond that, could this unwittingly support the tendency to think, perhaps, too locally and not enough globally? Applied in the environmental context, could it inadvertently encourage a duty of care that extends only to the corner of the world under one's direct control—the home—leaving responsibility for the rest to others?

The question, while delicate, is not an idle one. I saw in China a less entrenched cultural tradition of environmental stewardship than in other

[551] *See generally* RETHINKING CONFUCIANISM: PAST AND PRESENT IN CHINA, JAPAN, KOREA AND VIETNAM (Benjamin A. Elman, John B. Duncan & Herman Ooms eds., 2002) (discussing the presence of Confucianism in Korea, Japan, and Vietnam while examining the dangers of categorizing various types of Chinese and other Asian classical thought as "Confucianism"); Kumiko Aoki, *Confucius vs. Socrates: The Impact of Educational Traditions of East and West in a Global Age*, 14 INT'L J. LEARNING 35 (2008) (discussing how the basic educational philosophies of Japan, Korea, and China are rooted in Confucianism).

[552] *See supra* notes 548–549 and accompanying text.

[553] *Id.*

[554] *See, e.g.*, Freiberg, *supra* notes 548, at 187 (and quoted *supra* note 549).

[555] *See supra* notes 112–115 and accompanying text (describing periods of upheaval).

[556] *See supra* note 540 and accompanying text (attributing the phrase to environmental advocate Rene Dubos).

similarly crowded places, like Japan, the Netherlands, or Germany.[557] By environmental stewardship, I mean an ethic of responsibility that individuals hold for managing and maintaining the environment around them. Consistent with Confucianism, there is a strong ethic of responsibility for one's most immediate environment in China, but that responsibility seems to wane quickly the farther one gets from that boundary. Many philosophies similarly relax responsibility the farther one moves from the sphere of obligation; Professor Michael J. Sandel, a popular U.S. political theorist, articulates a western version of this sentiment in terms of "communitarianism."[558] But in China, the sphere of personal obligation may be smaller than others, and I wondered whether it held any implications for the challenges of environmental governance in general.

An example that is either frivolous or informative is the striking way that most Chinese people differentiate between the care they take of the environment inside their own homes and the care they take beyond that threshold. Chinese homes are immaculate on the inside, where extensive efforts are made to maintain cleanliness and beauty. As a rule, shoes are left at the front door. Hands are carefully washed before eating or handling food. In a well-appointed home, the walls and shelves are adorned with carefully chosen art and other objects reflecting the majestic culmination of thousands of years of Chinese culture: calligraphy, porcelain, paper cuttings, poetry, landscape paintings, and the like.

But outside that front door, the duty of care wanes quickly. The common doors, hallways, and stairwells in Chinese apartment buildings receive little attention from residents. Empty walls are often cracked with peeling paint and crumbling cement in seemingly abandoned hallways that open surprisingly into those beautifully maintained dwellings, once you cross that inner threshold. It is possible that this reflects other collective action problems relating to public or commonly-owned property, but from my conversations with friends and colleagues, it appeared to also reflect a widespread sense that what happens beyond the inner threshold is, simply put, someone else's responsibility. And as discussed in Part VI, crossing the outer threshold onto the street reveals an even more dramatic difference, with trash strewn liberally throughout the neighborhood.

Over my time in China, I couldn't help but wonder about the relationship between contrasting in-home and out-of-home obligations, environmental stewardship, and China's ancient philosophical traditions. These traditions don't always align with regard to stewardship, sometimes pushing in different

[557] UNITED NATIONS DEP'T OF ECON. & SOC. AFFAIRS, *List of Countries by Population Density*, STATISTICS TIMES, http://statisticstimes.com/population/countries-by-population-density.php (last updated Apr. 16, 2015).

[558] MICHAEL J. SANDEL, LIBERALISM AND THE LIMITS OF JUSTICE (2d ed. 1998) (discussing moral obligations between individuals and their communities).

directions for different reasons. Taoism, with its focus on humility, compassion, moderation, and human harmony with nature, provides foundation for an ethic of outwardly focused environmental stewardship, although other aspects of the tradition emphasize the inward pursuit of knowledge and carefree joyfulness.[559] In encouraging followers to let go of worldly desires, Buddhism is supportive of a sustainable, non-consumerist lifestyle, but it sets as its highest goal the accomplishment of detachment and inner wisdom, cultivating an ethic of inward obligation.[560] Confucianism's emphasis on maintaining social harmony by attending to one's appropriate sphere of influence[561] provides strong foundation for a more inwardly focused sense of stewardship—although this all depends on how narrowly one defines "appropriate."

It is in this regard that Confucian values may be undergoing change. What exactly is one's appropriate sphere of influence? Historically in China, that sphere has been defined by the boundaries of one's own home and family, weakening as the boundary radiates outward to larger communities in which other leaders have primary responsibility. But could the sphere of appropriate influence be seen growing to encompass the environment that we all share? Indeed, Japanese culture is also based on Confucian ideals, and environmental ethics in Japan encourage fastidious care for the environment outside the home as well as within it. Today, the Chinese government is working hard to gestate the values of the "Circular Economy" within the new social order—encouraging citizens to see the relationship between every-day behaviors and the health of the overall environment, and to understand the relationship between the health of the environment and overall human well-being.[562] Perhaps, consistent with Confucian principles, the wise leader is appropriately inviting the people to broaden their appropriate spheres.

That alone is an impressive and important undertaking, showing that environmental ethics are developing in China in tandem with sustainable policies. But there is no way around it: this is going to take an act of cultural change.

D. Environmental Stewardship as Cultural Change

The kind of cultural change I'm talking about—and the need for it—is hardly unique to China. It's the same kind of cultural change that both fomented and then followed the 1970s environmental movement in the United States.

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[559] *See generally* LAO TZU, TAO TE CHING (D. C. Lau trans., Penguin 1963) (c. 400 B.C.E.) (the principal ancient Chinese statement of Taoist thought).

[560] *See* JOHN SNELLING, THE ELEMENTS OF BUDDHISM, 39-65 (1990); *id* at 71–72 (noting that the Buddist principle of ahimsa—to cause no harm to others or oneself—extends to the environment and the world as a whole.)

[561] *See supra* notes 548–549 and accompanying text (discussing these tenets of Confucianism).

[562] *See supra* notes 536–537 and accompanying text (discussing the Circular Economy law).

Having grown up amidst that movement, I still remember a poignant example from within my own family, as recycling ideals were becoming an everyday part of American life. When curbside recycling began in my childhood neighborhood, we were asked, for the first time, to rinse cans and bottles before putting them out for street-side collection in a big blue bin. Incensed, my father had trouble getting past the idea that he was being asked to "wash garbage," and then to despoil the neighborhood with ugly blue bins. Yet when he complained to my sister and me, both of us under ten years of age, we were completely confused. "But it's not *garbage*," we insisted—"it's *recycling!*" And the blue bins didn't seem ugly to us, because we found beauty in the good they would do for our environment (perhaps similar to the aesthetic appeal that wind farms hold for those who value renewable energy development).

These were messages that my sister and I had internalized at school and among our friends, though obviously not at home. But in our family, as in so many others, cultural learning moved backwards through the generations. Though we were only small children, my sister and I gradually taught my father how to see the world in a new way. Now in his seventies, my father dutifully washes the recycling, and my mother carefully maintains separate receptacles for paper, plastic, glass and aluminum, and trash. And while this personal tale represents but a tiny shift in the bigger picture, it's important to remember that tiny shifts are cumulative. In the end, this is what cultural change looks like.

Cultural change should come from within and not without, goes the very wise wisdom. New environmental values are taking hold in China, following a different trajectory than they have in the West, unique to China's historical circumstances. ("Environmentalism with Chinese Characteristics?"[563]). Importantly, we can see these values moving dynamically between social norms and public policy, in both directions. Sometimes, social attitudes shift public policy, as when Beijing adopted the PM 2.5 standard to more accurately measure air pollution in response to public demand. Other times, public policy shifts social attitudes, as the One-Child Family Policy altered cultural expectations about family structure.[564] Public policy has the power to shape social norms, which is why the new Chinese environmental reforms hold so much promise. And public engagement can inspire new laws, completing the dialectic that has produced the Chinese environmental awakening.

Today, the Circular Economy campaign, Five-Year Plan renewables targets, Environmental Protection Law, water pollution laws, forestry initiatives, ivory ban, and all the other recent environmental reforms show that China is taking important steps toward a sustainable future. Just as China takes on issues of conservation and stewardship, so should Americans better grapple with our

[563] This is a play on the famous expression, "Socialism with Chinese Characteristics," which refers to the way China has adapted Marxist-Leninist ideology for its unique circumstances.

[564] *See supra* notes 24–35 and accompanying text.

issues of overconsumption and waste. Indeed, all human beings must learn to live more sustainably, but the world's two largest economies bear special responsibility. All of us must take care not only of our homes, but the hallways, streets, creeks, lakes, rivers, oceans, atmosphere, and biosphere that make up our shared environmental home. And as we move forward on our separate trajectories of philosophical growth, economic development, and cultural change, it just might help to better understand where each of us is coming from.

X. POST SCRIPT: RETURNING FROM CHINA TO THE UNITED STATES

A few months after my family returned from Qingdao to Portland, Oregon, the experience continued to unfold. As the Year of the Snake began, we found ourselves poignantly missing our friends and adopted family members across the Pacific. Yet as news reports broadcast apocalyptic levels of air pollution in North China that winter, we were also grateful to be home. This final essay shares the experience of coming back to the United States from China, or perhaps more generally, returning to the developed world from that which is still developing. It mixes deep gratitude for the blessings of the American bounty with queasy culpability over the implications of that bounty for international and intergenerational equity.

A. The Long Journey Home

In departing Qingdao, we flew to Seoul, South Korea, then on to Los Angeles, and finally to Portland. It was a long trip, but the transitioning away from China began immediately. Seoul is barely an hour's flight from Qingdao, but the airport was already worlds away—eerily foreign to that with which we had become accustomed. Surfaces were shiny and clean (and strangely well-lit), as though everything had just been wiped down. Airport shops sold unimaginably expensive perfumes, gadgets, and chachkies. We devoured the best sandwiches we have ever had in our lives from a Quizno's free-standing cart in the middle of the airport corridor. We didn't speak for the entire meal; we just savored the fresh lettuce, tomato, and avocado.

Indeed, when we got home, the first thing we did was eat. And eat and eat and eat. Especially fresh fruits and vegetables! Strawberries. Raw spinach. Fresh-squeezed orange juice. I have had a bowl of grape tomatoes on my kitchen counter every day since we got home, replenished like an open candy bowl. Pesto, chevre, basil. . . flavors that have never been so missed. Whole grains. Sourdough. Bread baked in my own oven, after a year in which nobody we knew even had an oven. Tollhouse cookies, donuts. . . my son ate a bagel every morning for the next several months and they never lost their allure. We knew that our Chinese friends returned from the U.S. with exactly the same desperation for their own food culture, but that didn't alter the joy of our own

reunion.

And I should note that despite this overly indulgent reunion, I was intensely aware of no longer being the fattest person in every room that I occupied.

On our second day back or so, I went grocery shopping with my son. I was mentally prepared for how psychologically fraught this might be. I had often heard tell of the experience from the other side—what it was like for Chinese and other foreigners to walk into an American supermarket for the first time. I knew it would be overwhelming, with fifteen brands of nearly identical peanut butter and every possible signal of over-consumption. I believed that knowing this would steel me for the experience, but I was wrong. I walked in and within seconds felt dizzy and confused. Everything was so sterilized, and there was just so *much* of it all. No animals roaming around or strung up on a rack, but so much light and color and so many brands . . . So much electronic activity, so much *everything*.

I dropped something, and I froze in my tracks like a crashing computer, because I couldn't figure out whether to pick it up (the correct response in the U.S., to avoid littering) or leave it on the ground (the correct response in China, where things that have touched the ground should not be touched with clean hands). It was all I could do to lead my baffled son back out the door and collect myself on a nearby bench.

I shut my eyes, centered my breathing, and considered how much we wanted those strawberries. And then, after just a moment's recovery, I weirdly just walked back inside and went shopping. Like I had never left. In fact, I knew exactly what to do. I plucked a sani-wipe from the dispenser, cleaned the handle of a shopping cart, plopped my son in the front, and roamed the aisles collecting milk, toilet paper, and just the right brand of peanut butter. Suddenly, it wasn't so strange after all.

Which became its own haunting experience: was all this excess really my personal norm?! So help me, it was. This was my normal, and normal for everyone else now around me, auto-piloting through this most basic American chore. But why didn't they know how abnormal it really was? Don't they know what the rest of the world eats and where they find it? That most people alive today (or at any time in history) could never imagine a place like this? Why aren't all these people moving distractedly around me more upset about the imbalance, the gluttony, the unfairness of it all? Why are they just walking around like there's nothing weird at all about any of this at all, when EVERYTHING about it is completely bizarre?

B. Strangers in Our Own Land

Navigating the rest of our renewed American lives continued along the same strange lines of being simultaneously refreshing and disturbing.

It was hard to get over how clean the world suddenly seemed. Like a movie

set, because it couldn't really possibly be that clean. The streets and houses were clean. The air was brilliant; sweeter than I had imagined. Colors seemed brighter because the air was clean, without the billowing Chinese particulates that dull the visual edges of everything in sight. We reveled in immersing ourselves in a bathtub once again, and running the clothes dryer was a guilty pleasure. Our clothes no longer smelled like air pollution, inevitable as they hung to dry amidst those plumes of particulates. But of course, running that American clothes dryer is probably adding greenhouse gases to the atmosphere in ways that rival particulate pollution, or even surpass the concern. Cognitive dissonance, cognitive dissonance—but we continued to use the clothes dryer.

There was not so much litter here in the U.S., and not so much dust. We were amazed to discover that our house had less dust on its surfaces after having been left alone for an entire year than we experienced on a daily basis in China. (No exaggeration: our East China home dusted in the morning was saturated again by evening—but then again, dust is mostly made of dead skin cells, and there are more than a billion people crowded along China's East Coast.) Nature in the U.S. was spectacular. The grass really was greener; the sky improbably blue. The moon was no rounder in America (as the Chinese sometimes joke it must be), but here you could find the man in it. And yet we also had to remember not to look directly at the sun, as we so often could in China.

This was a hard lesson for our son, who had become used to gazing openly upon that smoky, blazing orb in the sky. But oh, how his eyes lit up to once again play in a public playground—that monument to the carefree, whimsical freedoms of childhood! We never once found a children's playground in China (at least one that wasn't gated into the grounds of an expensive private school). And in his own preschool yard, the children were required to follow a prescribed order of activities, one at a time, during outdoor play: up the rope ladder, down the red slide, and then back in line, single-file, to wait your turn for another chance.

My son loved his Chinese teachers, who could not have been more loving or patient with him, and he gradually adjusted to the controlled style of Chinese schooling. But back in Portland, we enrolled him in a local Montessori preschool, where learning activities were largely self-directed. At first, the teachers didn't know what to do with his hesitation to act independently. "He asks permission to do everything!" one said, openly exasperated; "I've never seen anything like it!" After I explained the up-the-rope-ladder, down-the-red-slide nature of his previous experience, she began to appreciate the depth of his transition. And we reflected on the profound cultural differences that must follow from such deeply contrasting starting points.

C. Cultural Pride and Cultural Shame

Public safety and sanitation was different back home. It took a while for us to

trust that cars would truly stop for us in crosswalks and were not likely to pull up and park on the sidewalk we were walking along. I was happy to no longer scour medical offices for unclean surfaces and unsterilized needles, as I had learned (the hard way) to do in China. I no longer worried about giving my child medicine when he was sick. That said, after a year of regularly assuring our Chinese friends that not every American owns an assault rifle, we returned directly to the Clackamas Town Center mall shooting that took place just a few miles from our home, and then the unspeakable tragedy in Newtown, Connecticut.[565] I have never been more speechless, and so filled with national shame, trying to explain these events to our baffled Chinese friends.

But there were also moments of immense cultural pride. I cannot boast enough about American tap water, with which I have been hopelessly in love since my return. Drinking directly from the sink never gets old, and Oregon water was especially heavenly. My husband's workmates found him drawing a mug from the bathroom faucet and reminded him that there was a filtered cooler somewhere in the office—and he laughed until he almost cried. We declared to all who would listen that there was nothing better in the world than lukewarm, reliably running, municipally treated American tap water. Nothing! (And as I wrote from China back in 2012, we must do better to protect this hard-won feature of American life against backsliding regulation that would endanger it—as demonstrated by the stab in the eye to this principle that Flint Michigan represents.)

I reveled in American tap water, but it was confusing for me to wash dishes and water plants with such perfectly potable, deliciously drinkable water. It felt excessively wasteful. It still boggles my mind to see people using it to sprinkler lawns and wash their cars. "No, no," I think, "are you crazy? You could drink that!" But here in the U.S., most water that flows from a municipally-linked faucet is treated to be drinkable—even what gets used at the carwash. Which is obviously insane, especially in the arid West. I hope Americans will come to understand how incredibly fortunate we are to have drinkable tap water, before we end up not having it anymore.

D. At Home in America

Our neighborhood was lovely with trees and grass and wildlife, but strange with people. I found it weird the way we all drive to our individual houses, press the button on a garage door opener, and then drive into our homes without even getting out of the car. If you don't walk a dog, it's easy to never see neighbors face to face. In China, families take purposeful neighborhood walks after dinner,

[565] *See, e.g.*, *Sandy Hook Shooting: What Happened?*, CNN, http://edition.cnn.com/interactive/2012/12/us/sandy-hook-timeline/index.html (last visited Oct. 14, 2013) (reporting on the 20 students and 6 adults shot and killed at the Sandy Hook Elementary School in Newtown, CT in 2012).

where they see friends and spontaneously mingle with strangers every day. Public spaces are alive with community in China, but here, we are much more isolated. We live close to our neighbors, but with little random interaction. With Tivo and Pandora, we don't even share the same real-time broadcasts—no longer united in this last vestige of shared experience.

Americans are so alone, my visiting Chinese students would tell me from their disbelieving vantages points. Public spaces are so empty by comparison. The country is so empty, with vast unpopulated tracts of land. "And I am so lonely here," they would say, anxious to return to the thick sense of community they left behind. One student had his own room for the first time in his life—and he hated it. There was nobody to talk to. Nobody to care if you were even there or not.

While adjusting to being back in our own house—and as a reaction to how careful we were about not eating anything that had been in contact with anything that had once been in contact with a floor—we became unreasonably nonchalant practitioners of the "five-second rule." And at first, to an indefensible extreme. But after eating and breathing for a year in China, we came home with the impression that it didn't really matter what we put in our bodies anymore. A little dirt won't hurt, we told ourselves; how bad could that floor really be? (There's barely even any dust!) And for that matter, why bother with organic? Why sweat the preservatives? After our year abroad, we had been fully absolved of any illusion that our bodies were temples.

But our house—goodness gracious—was ridiculously, shamefully big. I was deeply embarrassed when two former Chinese students came to visit in December while they were studying abroad. I wanted so much to host them here, while they were alone in a strange land and unable to be with their own families as Americans celebrated unfamiliar holidays. But at the same time, I cringed at the thought of showing them where I lived. I didn't want them to think about what it represented, or the way it betrayed the differences in our lives that were invisible while we lived in the boxy Chinese apartment. The one in which my own family members nearly killed each other for lack of personal space, and that was still much bigger than the apartments these students had shared with their families their entire lives. True enough, their eyes nearly left their heads when they arrived, and I somehow managed to never show them the master bathroom.

That said, I had never loved a material object more than I loved my own oversized, coil-spring, pillow-top, all around over-the-top American bed once I was back in it. It was soft, and it didn't hurt my bones the way every Chinese bed I slept in did while we were there. I returned from China with bursitis in my hips because Chinese beds are so hard (and I was happy to get cortisone shots to treat them without having to fret about the safety of the medicine). But it wasn't just my American bed that had me in thrall: there were so many comfortable

chairs, with back support and arm rests. There was wall-to-wall carpeting, with padding beneath. On my first day back, I sank into the family couch and realized with astonishment that it had been a full year since I had been physically comfortable. Embarrassingly, my body wilted into the cushions like a crying child to her mother. My fallen arches stopped screaming about the constant concrete floor underfoot.

Of course, this too is a matter of cultural preference. One of my visiting Chinese students confessed that he had been sleeping on the floor since his arrival in the United States because American beds were all too soft. Everything in the U.S. is so unbearably soft, he complained—even the floors are soft! "Why are Americans so soft?" he asked innocently, unaware of both the humor and the gravity of his question.

E. Freedoms for Granted

The night before we left Qingdao, I stayed up past midnight with some of my favorite students talking about everything we could fit in before my departure, everything we hadn't spoken about yet. Tiananmen. Terrorism. When NATO accidentally bombed the Chinese embassy in Serbia during the Clinton administration.[566] What our parents tried to teach us about our roles in the world.

My students told me that the number one message their parents had tried to impart to them was to stay out of trouble: keep your head down, don't stand out, don't call attention to yourself. In the wake of Tiananmen, these were survival instructions. They described how their parents lovingly prepared them for their world by teaching them to disappear as much as possible into the background. Then they asked me what my parents taught me while I was growing up. I answered hesitatingly that my parents had raised me to never be afraid, to believe it was my responsibility to speak out, to stand up for what was right, and to change the world if necessary. We collectively stared at each other from across this enormous gulf of cultural experience, with both affection and amazement, as the significance penetrated.

In the air between Seoul and Los Angeles, while scribbling purposely vague notes about these conversations, it suddenly occurred to me that I no longer needed to be so vague. I could write freely. I didn't have to be purposely ambiguous about connecting names with events or statements. I could make full sentences rather than mnemonics. For the first time in a year, I didn't have to worry about my notes being found by uninvited visitors to my apartment, as I'd been warned to possibly expect at our orientation in Beijing. I didn't have to worry, as I had meticulously done all year, that the details I recorded would

[566] *See, e.g.*, *NATO Hits Chinese Embassy*, BBC NEWS (May 8, 1999), http://news.bbc.co.uk/2/hi/europe/338424.stm (discussing NATO air strikes on Belgrade that set fire to the Chinese embassy).

bring trouble for my friends.

I had the same experience during my first telephone conversation with my sister (a sibling—so un-Chinese!) on arriving home. After a year's worth of careful email and skype communication, always aware that what I had to say could be unintentionally interesting to someone other than my intended audience, I could suddenly speak freely. My Chinese friends had warned me to assume that my phone calls in China were not private, and I experienced at least one clear instance of intercepted email. But now, Edward Snowden's warnings notwithstanding, I fully believed that nothing I said could hurt anyone anymore. I could relax!

But no, I couldn't relax. It took a long while for me to shed the feeling of carefulness that must be part of the fabric of communication for many Chinese.

F. Between Worlds

So yes, the paradox of our homecoming was this disjuncture between feeling so simultaneously lost on return and like we had never left. Supermarkets aside, it was remarkably easy to rejoin American culture. Just as one never forgets how to ride a bicycle, it turns out that I had no trouble at all remembering how to drive a car, even after my year as a passenger (in a culture with unrecognizable traffic rules). I knew how to use a credit card, seek directions, and chat idly at the checkout line—at just the right level of detail, and for just the right amount of time. I knew how to watch television, program the remote, read the news, operate a dishwasher, cook in an oven, and do all the other things I had not done for the full year away. I knew how to operate American culture like an expert. It was easy to return, seductively comfortable, and mercifully welcoming to one already on the inside.

Yet reverse culture shock sneaks up on you. A few weeks after we got back, I fell into what I can only describe as a brief but intense depression. I had heard that culture shock on return could produce something like this, and I figure that's what it was, because it seemed untethered to anything else I could point to. I was delighted to be home in my soft bed and comfortable chair with my candy bowl of raw grape tomatoes, breathing fresh air and drinking tap water, using my clothes washer and dryer. Reasonable expectations of privacy, food and drug inspection, pedestrian safety, political freedoms—hallelujah, we were home!

But these were guilty pleasures, most, because of course life is nicer in the first world. Back now to that dizzy place. How to feel about all this? What about those we left behind? So strange to have worked so hard to find a way to fit in to this vastly different country—to penetrate the language, politics, and cultural traditions beneath the surface most tourists encounter—and then to just seemingly leave it all behind.

Then again, I know I am not really leaving it all behind. Each of us will

remain a bridge between the two cultures in our own ways—me as a teacher and scholar, my husband in his own career, my mother in her study of Chinese poetry, and my son as a child of two worlds now.

Indeed, in the weeks after we returned, my son spoke Chinese fluently and frequently, confused when his efforts to engage strangers in Mandarin failed. As time wore on, his moments of Mandarin were fewer and farther between, even though I took him to a children's Chinese class at the community college every Saturday afternoon for the next two years. But we couldn't support his language training at home, and he gradually fell behind his classmates—all the children or grandchildren of Chinese immigrants. His enthusiasm also waned as his memories of China were crowded out by new ones here at home. Eventually, he lost interest. "Nobody speaks Chinese here," he complained one day, "why do I have to?" On that day, we reluctantly conceded defeat.

Yet as the Year of the Snake began, and every year since then, he has proudly adorned the scarlet New Year's suit that our Chinese friends had given him at Spring Festival in 2012. He was so proud to be Chinese again, if only for the day. The next day, he was happy to be an American again, romping freely around the neighborhood playground. So yes, he is a clearly a child of two worlds now. And in some smaller way, I guess I am too.

XI. ENVIRONMENTAL EXPERIENCES IN THE UNITED STATES

A few years after I returned to the United States, I received an email from Sophie Shi, a Chinese lawyer who had recently returned to China after earning an L.L.M. in the southeastern United States. She explained that she was an editor of a WeChat social media account that publishes articles commenting on American and Chinese culture, and she asked my permission to publish Chinese excerpts from the original essays in which I had described my environmental experiences in China for the Environmental Law Professors Blog. I agreed, and she took on the project of editing and translating these essays for a Chinese audience.[567] More valuably, she authored a final section offering her parallel account of the environmental surprises she encountered as a Chinese citizen living in the United States.[568]

Sophie's insights provide the perfect capstone for this exploration of cultural

[567] Sophie Shi, *Two Perspectives: U.S.-China Environmental Dialogue—Part I*, WECHAT (Feb. 23, 2016), http://mp.weixin.qq.com/s?__biz=MzA4NzU2NzU0NA==&mid=402901849&idx=1&sn=1d103aba64e49152e5d7fc509f14c30c&scene=1&srcid=0223Rppd8UsePUinSvEAFHte&from=groupmessage&isappinstalled=0#wechat_redirect [hereinafter Shi, *Two Perspectives—Part I*].

[568] Sophie Shi, *Two Perspectives: U.S.-China Environmental Dialogue—Part II*, WECHAT (Feb. 24, 2016), http://mp.weixin.qq.com/s?__biz=MzA4NzU2NzU0NA==&mid=402920287&idx=1&sn=780022792702911001 63ed133306f5cc&scene=1&srcid=0224oG2Y4JBJGW3EU4g7a6OR&from=groupmessage&isappinstalled=0#wechat_redirect [hereinafter Shi, *Two Perspectives—Part II*].

contrast and mutual learning about environmental regulation and stewardship. She describes her amazement at the ubiquitous nature of automobiles in the United States—and not just any cars, but the largest and most fuel-inefficient cars possible. She notes, accurately, that Americans seem to have no concept of how to save electricity, and details the many ways in which Americans squander energy resources through the wasteful use of air conditioning and home appliances that, from the Chinese perspective, are either larger than necessary or unnecessary altogether. Finally, she matches the concerns I shared about food safety in China with concerns over the difficulty of obtaining food in the U.S. that has not been chemically cleaned, genetically modified, and/or hormonally treated. And she does so with more respect and sympathy for Americans' lifestyle choices than we probably deserve.

Her observations are so compelling that the best way to convey them is simply to share them directly. With her permission, and with the benefit of Google Translator and my own meager skills, this Part offers a rough translation of her thoughts.[569] While the rest of this Part continues to speak in the first person, it is Sophie that is speaking in the main text. My own voice appears only in the footnotes that provide occasional commentary. (There were no footnotes in Sophie's original text.)

A. About Cars

We arrived in the U.S. without a car, and from the very first day, we learned how difficult life can be here without access to a car. If you live in New York, perhaps you can get along easily without a car, but in most of the United States, life without a car is really challenging. The U.S. is sparsely populated, and there are row upon row of residential streets without the kind of small grocery stores, convenience stores, or farmer's markets that we were used to in China.

We looked for ways to get around without a car, and we occasionally took the bus, but it created an enormous amount of wasted time. It often took up to twelve hours to walk to the bus station, wait for the bus, do the shopping, and then wait for the bus again and walk home. Also, bus fare is not cheap—two people cost $5 round trip (but then again, so does a Starbucks iced coffee).[570] Only after living in the U.S. did my friends and I truly appreciate how convenient and inexpensive public transportation is in China.

Because public transport is so inconvenient in the U.S., almost every American family has a car. In China, the car is more of a status symbol, but in the U.S., the car is a necessary means of transportation, and Americans prefer private cars to public transportation. The American highway system is well

[569] *Id.*

[570] For the sake of comparison, you can ride the average bus in China roundtrip for the equivalent of about thirty American cents.

developed, and highway tolls are very cheap (mostly from $0.75 to $1.50). I learned that my American boss used to drive from Florida to New Jersey to attend family gatherings—about the distance from Guangzhou to Beijing—rather than traveling by train or airplane, as most Chinese would do over that distance.

It is common for U.S. households to have even two or three cars, which few ordinary Chinese families could do. Americans are particularly fond of large cars—you see pickup trucks and sport utility vehicles everywhere. Especially with gas prices going down in the U.S. (they were as low as $1.60 per gallon at the time), large cars will continue to be popular in the near term.[571]

People in Europe and Japan are more willing to buy smaller, lighter cars due to resource constraints there, but this is not the case in the more rural parts of the United States. We tried driving a small car on Atlanta highways, but we were surrounded by huge vehicles speeding all around us, and it felt dangerous even to change lanes. Driving in the U.S. was never fun for us.

Americans also tend to buy large cars because of the American way of life. Most American families have children, and so they buy SUVs to be able to bring the kids and the family dog on weekend outings. Americans move around a lot, and when they move to a new home, they often use their own cars to drag a trailer with all their furniture inside. Americans use their large vehicles for recreation too, often hauling a boat or other gear for weekends or holidays. In fact, Americans use their cars to do lots of things you wouldn't see in China, including dragging weeding machinery and pop-up campers. Sometimes you even see an American dragging an entire house behind a pick-up truck. I wondered, if you didn't have a big vehicle in America, could you really meet the needs of daily life?

Perhaps some Americans are thinking about the problem of car exhaust pollution, but I didn't know any families with children who had an electric or hybrid car. Some environmentally conscious businesses provided electric car charging spaces in their parking lots, but I never once saw anyone using one. Most Americans are accustomed to a lavish lifestyle, and driving a pickup truck or sport utility vehicle seemed perfectly fine to them.

B. About Electricity

I think Americans have not mastered the concept of saving electricity. My bathroom had six 60-watt bulbs installed over the sink, when two would have been enough for my daily purposes. Large shopping malls and street shops are still lit even after closing, because Americans worry that a dark store will invite

[571] By comparison, a gallon of gas in China costs about 24 元, the equivalent of about $4. *The price of 1 liter (1/4 gallon) of gas in Beijing is元6*, EXPATISTAN (last updated Jan. 30, 2018), https://www.expatistan.com/price/gas/beijing.

theft. In the United States, every building is kept cool in summer by air conditioning that is set extremely low. It is too cool in summer and too warm in spring and winter. Americans don't allow ventilation to work through open windows. Instead, they usually set central air-conditioning at a fixed temperature, and when the temperature is below or above that temperature, then the air conditioner will automatically start working.

Western families like baking. The American family kitchen has an oven big enough to fit a turkey, but more often, they use it to bake smaller things like biscuits or cakes. That means that the oven is using a lot more power than it actually needs—especially when it runs for many hours each day. Most American households also use a dishwasher for cleaning that most Chinese people do by hand. This inevitably will consume more electrical power by several orders of magnitude.[572]

Americans do not use clothes lines. On the weekend, they pile their dirty clothes into a washing machine and then into a drying machine. Chinese people are not used to this, so when we first came to the United States, we tried to dry clothes on the balcony—but the weather did not always cooperate, the gear we used broke, and the neighbors would often complain.[573]

When I returned to China last summer for a visit, I noticed that I actually became more vulnerable to heat and physical work. I tried to stay in air-conditioned rooms but I still could not stop sweating. A friend told me that in response to official calls for energy conservation, most domestic enterprises in China keep air conditioning set to 26 degrees Celsius (78.8 Fahrenheit) or more. Americans like to be in icehouses by comparison.[574] I think Chinese people have worked harder to achieve protection of the environment by limiting energy use.

I saw data in 2014 showing that 39% of American electrical energy came from coal, 27% came from natural gas, 19% came from nuclear power, and 7% came from renewable resources.[575] In the same year, only a quarter of Chinese

[572] Sophie is right about the energy consumed by an electric dishwasher, of course, but she may not realize that modern electric dishwashers consume far less water than hand dish-washing, making this one a tougher choice from the perspective of overall sustainability. Whether it is better to wash dishes by hand or electrically probably depends on the source of your household electricity and the relative scarcity of your local water supply. If you're in a water-poor area and your power source includes wind or solar, then the dishwater may be the better choice.

[573] Here, Sophie notes an especially troubling feature of U.S. sustainability culture, in which local zoning ordinances and homeowner association rules occasionally discourage the use of clothes lines even though they are far more environmentally friendly than electric dryers. *See, e.g.*, Tom Geoghegan, *The Fight Against Clothes Line Bans*, BBC NEWS MAG. (Oct. 8, 2010), www.bbc.com/news/magazine-11417677 (discussing homeowner association bans on clothes lines).

[574] Most government agencies and HVAC professionals recommend setting summer air conditioning to 78 degrees Fahrenheit for residences, *Spring and Summer Energy-Saving Tips*, U.S. DEP'T ENERGY, https://www.energy.gov/energysaver/spring-and-summer-energy-saving-tips (last visited April 24, 2018), but Sophie is right that most American businesses set it much colder.

[575] This published graph of U.S. energy sources in 2014 confirms Sophie's statistics. *U.S. 2014 Electricity Generation by Type*, https://upload.wikimedia.org/wikipedia/commons/5/54/

energy came from sources other than fossil fuels, and most of that was from large hydroelectric power plants.[576] Perhaps as American power technology has matured away from fossil fuels, people have developed habits of lavish electricity use.[577]

C. About Food Safety

U.S. supermarkets are always full of bright ambient lights and shiny food is well organized behind the counter, which is perhaps why the professor Erin Ryan said that the American supermarket environment is clean and bright. But for me, I have always been wary of the agricultural products sold there.

At home, my mother always picked the apples that looked real and avoided those that are too smooth and shiny. She said, "these apples are waxed, so we won't eat them." So I always look for genuine farm produce that may be stained with soil and spots but are really the fresher and healthier fruits.

However, after coming to America, I could not find that kind of fruit. The fruits sold to Americans are too beautiful—they look waxed, with no traces of soil, no spots from insects, no evidence that they were actually grown from nature. You can eat them directly from the counter without washing or peeling and never get sick.

All shelves of agricultural products have been inspected by the U.S. Department of Agriculture ("USDA"), which doesn't just inspect for pesticides but also governs the process of picking, cleaning, and packaging fruits and vegetables before they can officially enter the market. USDA criteria to prevent pesticide residue requires standard chemical cleaning before produce imported from other countries can be sold in the United States.[578]

Therefore, the agricultural products sold in U.S. supermarkets have been chemically cleaned. But given my learned vigilance about chemicals used in farming, I kept the Chinese habit of peeling fruits and vegetables.

Genetically modified food is everywhere in the United States. According to 2014 statistics I found from the Department of Agriculture, there were 169

U.S._2014_Electricity_Generation_By_Type.png.

[576] *See, e.g.*, Euan Mearns, *China: Post-Industrial Revolution*, ENERGY MATTERS (June 19, 2015), euanmearns.com/china-post-industrial-revolution/; *China: World's Largest Energy Consumer and Greenhouse Gas Emitter*, INST. FOR ENERGY RES. (May 20, 2015), https://instituteforenergyresearch.org/analysis/china-worlds-largest-energy-consumer-and-greenhouse-gas-emitter/.

[577] It's very generous of Sophie to suggest this, but I'm afraid Americans developed their lavish habits of electricity use long before we began to switch to more renewable sources, which suggests to me that most Americans just aren't thinking enough about how we can better conserve energy.

[578] Indeed, Sophie is more knowledgeable about this than many Americans. *See, e.g.*, *Setting Tolerances for Pesticide Residues in Foods*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/pesticide-tolerances/setting-tolerances-pesticide-residues-foods (last visited Apr. 24, 2018) (noting that the FDA tests food produced in the United States and food imported from other countries for compliance with pesticide residue limits).

million acres of genetically modified crops (mainly corn, cotton, and soy beans), equivalent to half the cultivated land area of the United States.[579] The greatest benefit of GM crops is to reduce pests. This substantially reduces the need for farmers to spray pesticides on crops, reducing the burden on American farmers.[580] This also explains why American agricultural products look so perfect.

Like all Americans, we had to buy a variety of genetically modified foods. Some Chinese families with children will specifically buy organic food, but the price of organic food is generally two to three times higher, which was too expensive for us.

In fact, I was more worried about hormone problems in American meats and dairy products than the problem of genetically modified produce. Many foreign girls who come to United States complain about excessive growth of body hair, and I have noticed this myself. Later, after we changed to eating only organic eggs and milk, that situation improved.

Interestingly, we once went to a Zaxby's (similar to a KFC fast food restaurant) on a day that the restaurant was very busy. We waited for nearly an hour, and ended up chatting with the American family at the next table. When we asked about rumors that KFC's chickens were treated with growth hormones, their response was "So what? As long as the U.S. Food and Drug Administration thinks it is safe, we can eat it."

The American people may be too trusting. Shortly before writing this article, I saw reports that the FDA has approved genetically modified salmon for human consumption.[581] The genetic alternation allows the growing period for these salmon to be cut in half, from 36 to 18 months.[582] After this news broadcast, my friends over dinner joked about this "monster salmon," but they said that as long as the FDA approved it, they are willing to eat it.

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[579] *See* JORGE FERNANDEZ-CORNEJO, SETH WECHSLER, MIKE LIVINGSTON & LORRAINE MITCHELL, GENETICALLY ENGINEERED CROPS IN THE UNITED STATES (2014), https://www.ers.usda.gov/webdocs/publications/45179/43668_err162.pdf.

[580] *But see* Dan Charles, *How GMOs Cut the Use of Pesticides—And Perhaps Boosted It Again*, NAT'L PUB. RADIO (Sept. 1, 2016), https://www.npr.org/sections/thesalt/2016/09/01/492091546/how-gmos-cut-the-use-of-pesticides-and-perhaps-boosted-them-again (raising questions as to whether GMO pest-resistant crops will really reduce pesticide use over time).

[581] Perhaps Sophie saw the following report: Bernadette M. Dunham, *AquAdvantage Salmon Approval Letter and Appendix*, U.S. FOOD & DRUG ADMIN. (Nov. 19, 2015), https://www.fda.gov/AnimalVeterinary/DevelopmentApprovalProcess/GeneticEngineering/GeneticallyEngineeredAnimals/ucm466214.htm.

[582] *See, e.g.*, Peter Murray, *Genetically Modified Salmon That Grow Super Fast*, SINGULARITYHUB (Jan. 2, 2013), https://singularityhub.com/2013/01/02/fda-approval-for-genetically-modified-salmon-that-grow-super-fast/#sm.0001gre4u317mocymr95pwb0ryxqa (noting that genetic modification allow salmon to reach market weight in eighteen months instead of three years).

D. Post Script

Living in China allowed Professor Erin Ryan to see the advantages of traditional Chinese philosophy and culture. She very much appreciated Chinese people's good habits, exercise, and use of clothes lines. She appreciates the ideas behind traditional landscape painting, where human beings are represented as just a small part of the breadth of all nature.

I also learned from living in the United States. On the one hand, I saw the extravagance of the American lifestyle. But I also saw their positive environmental activities. For example, Americans always handled their garbage responsibly. Whenever we went to the park, we saw Americans exercising this kind of self-discipline. On the road, there was basically no garbage. Parks and communities always provide pet waste garbage bags, so dog owners are conscious of their obligation to clean up waste. Environmental protection was truly everyone's responsibility.

As Professor Erin Ryan said, China has also begun to realize the importance of sustainable development at the macro level. Our large population faces diverse and complex environmental issues. We look forward to ongoing progress, but the process may take time. –Sophie Shi.

XII. CONCLUSION

This collection of essays has chronicled my through-the-looking-glass experience as an American environmental law professor plunging into ordinary family life amidst China's uniquely challenging environment. They explore the environmental baselines of life in modern-day, urban China, and how they contrast with those in the United States. They describe what it's like to live in a rapidly developing society with limited environmental regulation of air, water, and product safety—but they also highlight those environmental realms in which China has surpassed American efforts, including public transportation, renewable energy development, individual consumption levels, and the increasing national commitment to effective environmental governance (even as American environmental regulation threatens to backslide).

My time in China was transformative for me as an environmental professional, as a teacher, as a mother, and as a citizen. Stepping outside of one's own cultural boundaries is transformative by definition, because it allows you to see with clarity the features of life that become invisible within the mandatory strictures of the world in which each of us became who we are. In China, I learned what it was like to live within environmental conditions that seem unimaginable from within American culture—including epic levels of air and water pollution, constant anxiety over food and product safety, and the looming waste management crisis. I tasted the fear of harm to my family that is a regular feature of life in the developing world, and I witnessed the fortitude

and adaptability that citizens of such nations use to move forward under in the face of that stress.

Yet living in China also helped me understand, echoed by Sophie Shi's insights, those features of American life that seem unimaginable—and some of them downright irresponsible—to most Chinese. The extravagance with which Americans consume energy and other scarce resources is staggering, and our steadfast refusal to consider the relationship between our lifestyles and growing environmental problems at home and elsewhere is perplexing to those who work hard to live within more constrained environmental budgets. On the whole, Americans have also become inured to our own version of food safety concerns, as our supermarkets are increasingly stocked with food that has been chemically, genetically, and hormonally modified at some point in the production process. Those fortunate enough to afford organic alternatives can easily forget what it is like for the majority who cannot.

Finally, living in China helped me appreciate those features of American governance that have countered environmental degradation since the 1970s, and to worry about how conditions may worsen as we increasingly take environmental law for granted. Living in China also helped me appreciate the power of a regulatory system that works as one—marshaling all its power toward the rapid accomplishment of designated goals—in contrast to my home system of government, so hopelessly entangled in partisanship that it threatens not to work at all. Still, and perhaps most precious of all, living in China reminded me to cherish the rights of participation in governance that I enjoy here at home, providing me an opportunity to affect policy changes when I think the government has set the wrong goals.

Environmental challenges continue to unfold around the world as the global population increases, economic development pushes forward, climate patterns change, and planetary systems adapt. When it comes to our respective responsibilities for managing these problems, both the United States and China face uncertain prospects. In the previous century, the United States pioneered regulatory responses to reign in the most immediate environmental harms associated with our economic development, as well as cultural foundation for public environmental consciousness. In the present century, these advances are under threat, as pollution regulations are relaxed, and our lifestyle choices fail to reflect the new environmental challenges of climate change. In China, environmental consciousness is a more recent phenomenon, and there are different barriers to success. Until recently, profound enforcement problems have undermined well-intended policies. Environmental stewardship norms are still new. Yet in contrast to the United States, the Chinese government is fully prioritizing environmental governance, and Chinese citizens can draw on a more entrenched tradition of self-discipline to work as members of a team toward societal goals.

Writing at this pivotal moment in both Chinese and U.S. history prompts compelling questions about the diverging trajectories the two nations appear to be taking. One wonders whether we will look back on 2017 as the year in which the United States and China definitively reversed environmental roles. In this one year, China made staggering investments in developing renewable sources of energy, halted production of hundreds of car models that failed minimum fuel emission standards, and shuttered tens of thousands of factories that were violating pollution standards.[583] Over the same year, the United States announced plans to scale back key environmental regulations,[584] including the Clean Power Plan[585] and Clean Water Rule,[586] repealed hard-fought protections for public lands,[587] and opened the nations' coastlines to oil drilling.[588] Perhaps most significantly, President Trump withdrew the United States from the international Paris Agreement on measures to prevent climate change, just one year after the U.S. and China had joined forces to lead the world.[589] President Xi has led China in the opposite direction, but he has also amassed a threatening amount of executive authority,[590] ironically at the same time many Americans are reconsidering the wisdom of concentrating authority in the federal executive.[591]

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583 *See supra* text accompanying notes 266 (investment in renewables), 152 (halted production of car models), 148 (shuttering of factories).

584 *See* Popovich et al., *supra* note 480 (listing sixty-seven environmental regulations the Trump Administration plans to repeal).

585 Friedman & Plumer, *supra* note 475.

586 Coral Davenport, *E.P.A. Moves to Rescind Contested Water Pollution Regulation*, N.Y. TIMES (June 27, 2017), https://www.nytimes.com/2017/06/27/climate/epa-rescind-water-pollution-regulation.html.

587 Julie Turkewitz, *Trump Slashes Size of Bears Ears and Grand Staircase Monuments,* N.Y. TIMES (Dec. 4, 2017), https://www.nytimes.com/2017/12/04/us/trump-bears-ears.html. In response to this and other concerns, the majority of National Park Service Board submitted protest resignations in early 2018. Scott Neuman & Colin Dwyer, *Majority of National Park Service Board Resigns, Citing Administration Indifference*, NAT'L PUB. RADIO (Jan. 17, 2018), https://www.npr.org/sections/thetwo-way/2018/01/17/578525840/majority-of-national-park-service-board-resigns-citing-administration-indifferen.

588 Darryl Fears, *Trump Administration Plan Would Widely Expand Drilling in U.S. Continental Waters*, WASH. POST (Jan. 4, 2018), https://www.washingtonpost.com/news/energy-environment/wp/2018/01/04/trump-administration-plans-to-allow-drilling-off-all-u-s-waters/?utm_term=.73b46e28b5f0.

589 Meyer, *supra* note 478.

590 *See supra* note 516 and accompanying text (discussing China's recent abrogation of presidential term limits).

591 *See* Jeffrey Crouch, Mark J. Rozell & Mitchel A. Sollenberger, *The Law: The Unitary Executive Theory and President Donald J. Trump*, 47:3 PRESIDENTIAL STUD. Q. 561 (Sept. 2017), https://doi.org/10.1111/psq.12401 (noting that President Trump's expansive assertions of executive power justify a re-examination of the unitary executive theory); Marc Fisher, *Donald Trump and the Expanding Power of the Presidency*, WASH. POST (July 30, 2016), https://www.washingtonpost.com/politics/donald-trump-and-the-dangers-of-a-strong-presidency/2016/07/30/69cfc686-55be-11e6-b7de-dfe509430c39_story.html?utm_term=.83216ad0db0b (reporting on

Yet the two nations may be also reversing roles in a subtler, ultimately more important respect. The United States has ambitiously regulated environmental harm for decades, and as a result, environmental living conditions are quite good throughout most of the country. Americans enjoy relatively clean air and water, and while most appreciate the benefits of these environmental amenities, it may be that we have come to take them for granted. By contrast, meaningful environmental law is still a recent phenomenon in China, and so environmental conditions are still fairly bad for much of the country. The Chinese appreciate their improved economic standard of living, but they have become outraged by the toll that environmental degradation is taking on public health. The government is thus embarking on a program of more aggressive environmental regulation, but it will take some time before the Chinese people's environmental quality of life reflects these efforts. At the same time, the United States is embarking on an aggressive campaign to reverse environmental regulation—and in time, Americans' environmental living conditions will probably reflect that as well.

As always, our best hope is to draw on one another's strengths and to learn from one another's experiences. In this regard, let the early success of American environmental law inspire the Chinese to adopt more effective, rule-of-law oriented enforcement models. Let the present experience of Chinese environmental degradation motivate Americans to protect our regulatory system from falling into further disarray, and let Chinese efforts to adopt more climate-forward conservation policies inspire the U.S. to do better. Finally, let the American model of genuine public participation inspire the Chinese system to allow citizens a greater role in transparent and responsive environmental governance, and let the Chinese model of individual self-discipline and sacrifice inspire Americans to learn how to play better as members of Team Earth. And as on all teams, all members must learn how to better coordinate, and to better understand a shared situation from multiple perspectives. Even as we pursue our separate visions of economic and political development, we are inextricably linked together in protecting the one fragile and beautiful world that we share. More than ever, our global future depends on our shared success.

public anxiety over Trump's aggressive assertion of federal executive power and questioning whether American checks and balances still work); Dana D. Nelson, *The 'Unitary Executive' Question*, L.A. TIMES (Oct. 11, 2008) www.latimes.com/opinion/la-oe-nelson11-2008oct11-story.html (arguing that executive overreach during George W. Bush's presidency shows the perils of amassing power in the federal executive).