CROSS-CURRENTS

EAST ASIAN HISTORY AND CULTURE REVIEW

Ecologies of Empire: From Qing Cosmopolitanism to Modern Nationalism

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Abstract

According to modern ecological theory, ecosystems are fragile combinations of diverse elements, and their resilience—or ability to recover after external shocks—varies as the system develops. Under conditions of low resilience, the system can collapse unpredictably and shift into a new state. Biodiversity in ecosystems, however, helps to maintain resilience. These basic natural principles also help to illuminate the social processes of empires. Like ecosystems, empires expand, grow, and collapse unpredictably when they lose the ability to respond to external shocks. Just as biodiversity increases resilience, imperial formations prosper when they are more cosmopolitan, incorporating diverse cultural elements that foster institutional innovation, and they suffer collapse when they limit participation by outside challengers. The author develops this analogy between ecosystems and imperial formations through a discussion of the Ming and Qing empires, concluding with reflections on the Maoist production system and the current resilience of China today.

Keywords: ecology, empires, environmental history, famine, Ming, Qing, China, Mao, resilience, sustainability, diversity

The title "Bordering China: Modernity and Sustainability" links together three popular topics in the study of China today: (1) the frontiers and borderlands of China, past and present; (2) China's modernization program and its connection to the imperial past; and (3) environmental history and environmental policy. How are these three themes connected?

This article connects the theme of cosmopolitanism, including cultural diversity, to my own research on Chinese environmental history.[1] Stevan Harrell and I gave seminars on ecological history in the United States in May and September 2012, and that summer I lectured

to a Chinese audience in Shanghai on the development of the field of environmental history, so this subject has been on my mind for a while. These are just a few sketchy observations, but I hope they may be useful in stimulating further research.

Let me begin with a photograph of the great dust cloud that formed over China in 2007 (figure 1). The particles in this cloud were blown over the Pacific and around the rest of the world, depositing particulates in California and elsewhere, crossing national borders, and affecting air quality in distant lands (Uno et al. 2009). Examining this cloud allows us to look at questions of modernity, borders, and environmental change. The cloud itself formed over the Taklamakan Desert, as strong winds blew desert sands into the high atmosphere. But other elements produced by China's industrial boom have also entered into global circulation (Jaffe et al. 1999). These particulates are a product of two processes resulting from China's reform program: global trade and domestic industrialization. The grasslands of Inner Mongolia have been heavily exploited to raise goats for the export of cashmere wool, and this in turn has caused desertification and produced sand that is blown into the atmosphere. The industrial pollution of coastal China has also contributed to toxic clouds. Thus this cloud illustrates the connection between our three themes of borders, sustainability, and modernity.
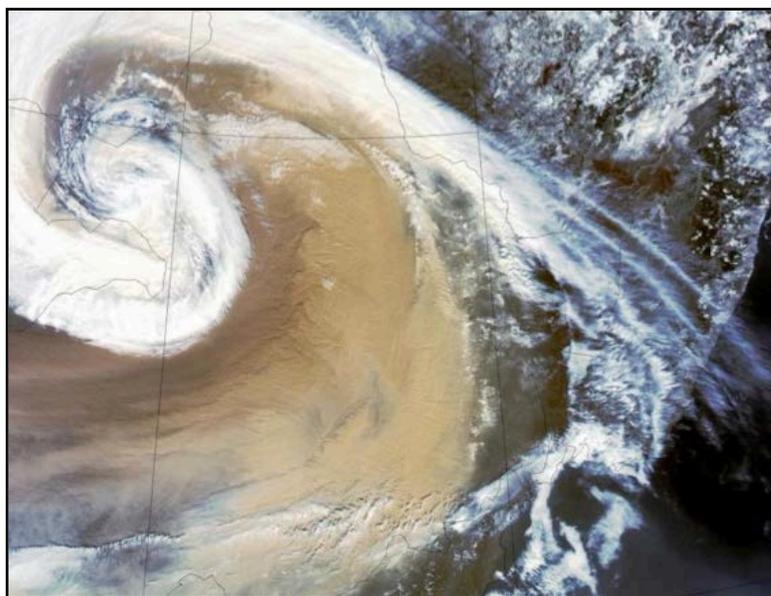

Figure 1. The great dust cloud of 2007. *Source*: GreenPacks (2009).

This article uses concepts from modern ecology to understand China's historical and contemporary challenges in addressing environmental degradation and sustainability. I first outline a model of the adaptive cycle as applied to both small ecosystems and larger scales of human societies and then give a few examples of how we may frame our understanding of China's environmental history using this model. This biological model stresses the importance of species and environmental diversity for sustainability and resilience. After introducing this model, I discuss the concepts of cosmopolitanism and diversity in the human cultural sense, to see if we can link these concepts to changes in material forms of Chinese states and economies in modern times. Thus, this article is about the ecology of empire in both natural and human senses. It raises questions such as: What production systems underlie the unity of Chinese empires and the modern Chinese state? How are different peoples and cultures kept together under imperial and national rule? And what happened to the diversity of Chinese social space during the transition from imperial to national regimes?

Many observers have noticed the similarity between the territory of the People's Republic of China (PRC), excluding Mongolia and Taiwan, and that of the Qing at its maximal degree of expansion. Moreover, modern-day China more nearly approximates the size of the empire from which it descends than any other nation-state left in the world. All other empires have broken up into many pieces. And China has long been a vast space composed of many regions, each with distinctive climatic, geographic, and cultural characteristics. These regions have persisted for centuries, despite a tumultuous history of imperial collapse and revolutionary upheaval.

Some perspectives from modern ecological theory and environmental history can help us understand both China's diversity and its repeated experiences of collapse and renewal. In short, periods of expansion in China's imperial history generally corresponded to times of increased diversity of peoples and openness toward multiple perspectives, among both the elites and the masses. These periods were followed by briefer times of contraction and inwardness, during which hostility toward the outside world increased and internal dissent was repressed. These processes of expansion and contraction often proceeded in parallel with changing cultural horizons of openness and exclusion.

The Adaptive Cycle

The adaptive cycle model was originally developed by the ecologist C. S. Holling and others in the 1970s to explain how ecosystems cycle between different stable states as they undergo sharp transitions between states.[2] The *r* phase, called "exploitation," describes a period when there is rapid dispersal and rapid growth of species competing with one another in an open area (like a meadow). This is followed by the *K* phase of "conservation," a time of slower growth and protection of gains (for example, a climax forest). We can extend the model to embrace human economies as well as biological ecosystems. For an economic theorist, the *r* phase describes the activities of entrepreneurs, while the *K* phase describes bureaucratic consolidation. But as consolidation—whether natural or organizational—proceeds, the system becomes increasingly less resilient—that is, more vulnerable to external shocks. When a disaster strikes— in the form of a forest fire, drought, or insect pests, or financial crises, or rebellion—the system shifts to the "release," or omega (*Ω*) phase. The economist Joseph Schumpeter called this a process of "creative destruction"; China historians might call it dynastic collapse.

After this collapse, there is a phase of "reorganization"—the alpha (*A*) phase—in which materials released by the collapse, like nutrients, are put back together to begin a new phase of growth. Pioneer species reseed a burned area; new plants grow in lakes and woodlands; and grasslands recover their vegetation. Then a new phase of growth begins, with a somewhat different combination of elements or a repetition of the previous process.

The adaptive cycle resembles the traditional Chinese theory of the dynastic cycle. The two models share a focus on growth, loss of resilience, collapse, and reorganization under a new dynastic or biological regime. Like the dynastic cycle theory, the adaptive cycle model leaves open the question of whether the reorganization phase will lead simply to restoration of the previous system, or to the creation of a new ecosystem that operates on a larger scale, or with different elements, or with a different dynamic. It's an intriguing parallel, but the adaptive cycle is rooted in natural science and not morality. The adaptive cycle model also shares some similarities with the Marxist idea that contradictions drive social and natural change, but it does not necessarily imply that the outcome of these contradictions is a higher stage of society. These three models share a general perspective that systems operate under conditions of dynamic

instability that are barely kept under control by natural or political forces. These models contrast with those of classical ecology and neoclassical economics, both of which were rooted in theories of static equilibrium derived from thermodynamics of the late nineteenth century.

The first application of the adaptive cycle model, by C. S. Holling, looked at the relationship between spruce fir forests in eastern North America, an insect called the spruce budworm, and the birds that controlled the insects (Holling 1973; Gunderson and Holling 2002). There were two stable states: one with low budworm populations and young, growing trees and another with high budworm populations, mature trees, and extreme defoliation. Periodically, every 40 to 130 years, up to 80 percent of the spruce fir trees would die from budworm attacks in a natural cycle. The reason for the sudden flip from one state to another was the change in effectiveness of birds in keeping the budworm population down. As the foliage grew thicker on the maturing trees, the birds could not find the budworms as easily, so the budworm population would suddenly explode, thus damaging the trees and resetting the system. The famous biologist Rachel Carson, whose writings founded the modern American environmental movement, noted the disastrous consequences of massively destructive spraying of DDT to rid forests of the budworm in her now-classic book, *Silent Spring* (Carson 1962, 130–137).

The case of the spruce fir forests, a simple model with only three actors, has had large implications. First, it showed that, contrary to earlier predictions by ecologists and economists, ecosystems do not naturally achieve equilibrium. Instead, they cycle unpredictably among different states, and the transitions between those states are sharp and catastrophic. The adaptive model has been confirmed for many other ecosystem processes, including eutrophication of lakes, growth of coral reefs, and the relationship in arid regions among grazing animals, grasslands, and woody shrubs (Gunderson and Holling 2002, 30–39). The model is not only a description of nature; it also has implications for how human societies can manage a natural system and how they should intervene in it. It strongly questions the idea that one can achieve a permanent stable state. Repeated, sporadic waves of "release," or "creative destruction," or "permanent revolution" seem to be embedded in nature.

Second, it points to the significance of resilience: the ability of a natural or social system to resist unpredictable shocks. Figures 2 and 3 reveal that the model is really a three-dimensional one, where the third dimension is the hidden parameter of resilience.
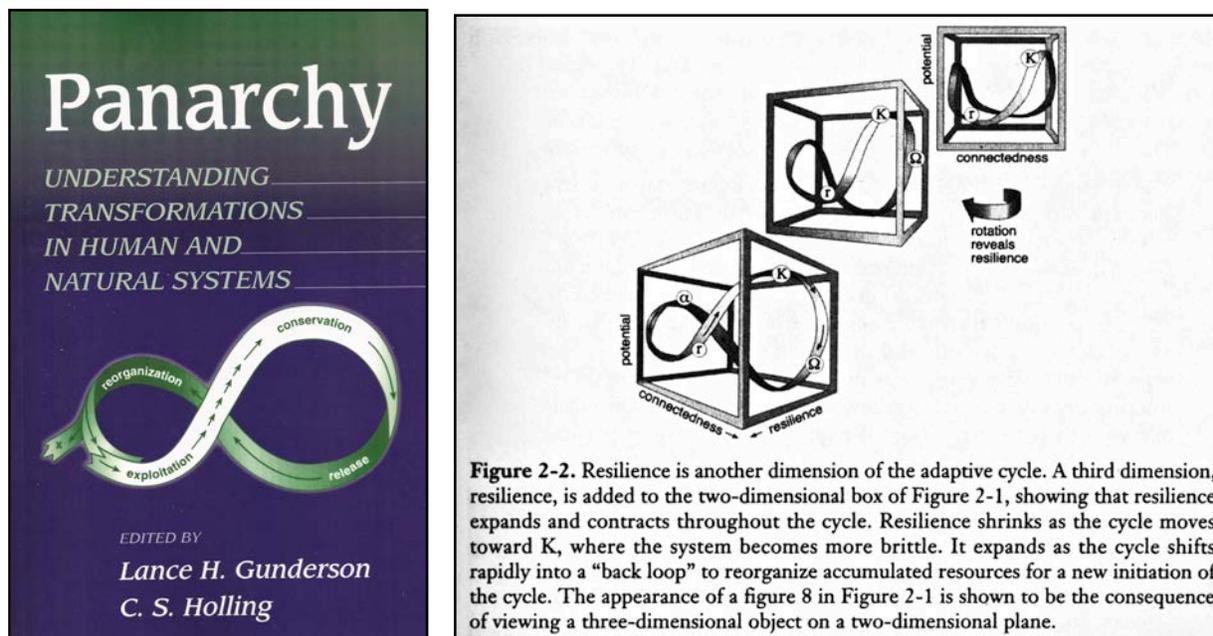

Figure 2 (left). The adaptive cycle model. *Source*: Gunderson and Holling (2002, cover).

Figure 3 (right). Resilience in the adaptive cycle. *Source*: Gunderson and Holling (2002, 41).

A time of apparent expansion—of a forest, an empire, or an economy—can mask a period of reduced resilience, which in turn increases the threat of a catastrophic outcome. Gunderson and Holling distinguish between "engineering resilience" and "ecological resilience" (Gunderson and Holling 2002). Engineering resilience aims at achieving a fixed target, such as maximizing sustainable yield of a fishery—or, to use a Chinese example, maximizing grain output—while ignoring the effect that maximizing a single variable has on the entire system. Ecological resilience takes into account the interaction among multiple factors, not just a single one. The goal of sustainability is not simply to reach a fixed target but to remove the underlying factors that cause the adaptive cycle to have such severe results.

Managing the Yellow River

The management of the Yellow River provides an excellent analogue to the adaptive cycle and suggests how we might apply this model to a system that includes human intervention. The Yellow River carries a high load of silt, which is picked up from the loess soils of northwest China after heavy rainfall in a deforested region. As the rate of flow slows down in the North China Plain, the silt builds up. In a natural river, the silt would cause the river to meander across the flat plain. But beginning around the second century B.C.E., the humans who settled the North China Plain built large dikes around the river, for military purposes. Trapped by the dikes, the silt settled down in one place, causing the riverbed to rise. In response, Chinese settlers invested much effort in building the dikes even higher, and thus the system moved toward greater inputs of capital and labor (the *K* phase) in order to maintain the river's flow. But the dikes would eventually break, causing catastrophic releases. The river would flood the plain, drowning and uprooting millions of peasant farmers. The riverbed would then shift, sometimes north or south of the Shandong Peninsula. "Reorganization" in this cycle meant mass migrations of farmers, destruction of farmland and villages, and great human suffering. Eventually, settlement would resume, and the cycle would begin all over again. This process, including human actors, closely resembles the abstract model of the adaptive cycle. As population density increased in North China over many centuries, the incidence of flooding grew more severe, but the essential dynamics of the cycle did not change for over a millennium (Elvin 1993, 30–33; Mostern 2013).

But we have to add another element: sometimes the release phase was deliberately triggered by humans for political purposes. Several times in imperial history Chinese officials deliberately broke the dikes for strategic reasons. Song rulers did this in the eleventh century C.E. to stop the Liao invasions; Ming rulers did it in the sixteenth century to protect imperial ancestral tombs and grain transport; and Chiang Kai-shek notoriously broke the dikes in the twentieth century to stop the Japanese invasion of North China (Zhang 2009; Ma 2010; Muscolino 2010). In each case, this hydraulic warfare failed at immense human cost. These examples reveal one factor that differentiates human systems from natural ones: the ability of political elites to make ecological choices that have large consequences. In these cases, some of the consequences (causing the flood) were intended, but others (stopping the enemy) failed. In ecologists' terms,

potential leaks away, and the system flips into a less productive and less organized form as a result of the intervention of elites concerned more with state power than with human welfare.

Diversity and Sustainability in Ecosystems and Empires

The Yellow River example shows that ecosystems and empires are closely linked. Ecosystems and empires also share features of diversity that affect their ability to endure for long periods of time. As Gunderson and Holling concisely put it, "biodiversity contributes resilience to the functioning of an ecosystem" (2002, 406). The phases of highest external influence and greatest internal diversity correspond to the early periods of reorganization and expansion. For ecologists, these phases include the maximum potential for biological creativity, through the introduction of new species and new ecosystem functions. To understand the durability of empires and nations, we likewise need to consider cosmopolitanism and diversity. Cosmopolitanism implies openness to influences from abroad and willingness to respect differences. Diversity means promoting internal differentiation through policies of decentralization, indirect rule, and cultural pluralism.

Theorists contend that empires are built by incorporating a wide variety of peoples and that empires support difference in their institutions and legitimating ideologies. The historians Jane Burbank and Frederick Cooper state:

> Empires are large political units, expansionist or with a memory of power extended over space, polities that maintain distinction and hierarchy as they incorporate new people. The nation-state, in contrast, is based on the idea of a single people in a single territory constituting itself as a unique political community. . . The nation-state tends to homogenize those inside its borders and exclude those who do not belong, while the empire reaches outward and draws, usually coercively, peoples whose difference is made explicit under its rule. The concept of empire presumes that different peoples within the polity will be governed differently. (2010, 8)

The historical sociologist Charles Tilly likewise argues:

> An empire is a large composite polity linked to a central power by indirect rule. The central power exercises some military and fiscal control in each major segment of its imperial domain, but tolerates the two major elements of indirect rule: 1) retention or establishment of particular, distinct compacts for the

government of each segment; and 2) exercise of power through intermediaries who enjoy considerable autonomy within their own domains in return for delivery of compliance, tribute, and military collaboration with the center. (1997, 3)

Every empire could accommodate radically different ecologies and cultures. The accidents of war and expansion brought diverse peoples under one imperial gaze. Because imperial borders are not fixed by ethnic criteria, empires by their nature must be set up to accommodate and manage difference. As the European historian Charles Maier notes,

> Imperial and national frontiers—even if of similar outward type—usually enclose different processes of governance and institutional structuration within their respective territories. The nation-state will strive for a homogeneous territory. . . . Because of their size, and their assumption of power over old states and communities, empires possess a far less administratively uniform territory. (2006, 102)

Burbank and Cooper point to the process of imperial expansion, which creates heterogeneous territories acquired through contingencies of war and diplomacy; Tilly stresses the use of indirect rule in imperial administration; and Maier remarks on the different kinds of commitments to frontiers in empires and nation-states. Each of them singles out one aspect of the contrast between imperial diversity and national homogeneity.

Empires, of course, have been extremely long-lasting political structures, far more enduring than nation-states so far. As Burbank and Cooper write:

> Empire was a remarkably durable form of state. . . . By comparison, the nation-state appears as a blip on the historical horizon . . . whose hold on the world's political imagination may well prove partial or transitory. (2010, 2–3)

This imperial combination of diversity and endurance suggests that, following the ecological perspective, we may draw an analogy between the role of biodiversity in sustaining resilient ecosystems and the contrasting effects of difference and homogeneity on the long-term survival of empires and nation-states.

Chinese Examples of Imperial and Ecological Dynamics

Such broad contrasts between the heterogeneous compositions of most empires and the tendencies toward homogenization and standardization generally seen in nation-states are plausible, but they neglect dynamics within imperial formations that can shift an empire's orientation away from openness and diversity toward less expansive and more narrowly defined identities.

Empires originate from conquests by composite elites, usually created in fluid frontier zones. The Ottoman Empire was founded in Anatolia by a mixed group of Byzantine Greeks, local adventurers, and Turkish military and nomadic forces. The early Muscovite Empire, similarly, mixed Russian, East European, and Tatar elements. The early Ming founder was a former Buddhist monk arguably influenced by Manichaean religious beliefs, who attracted a wide array of followers to his peasant armies and only later portrayed himself as an orthodox Confucian and attempted to repress his humble and heretical origins. Finally, the Manchu founders of the Qing expertly put together a multicultural coalition—including Manchu soldiers, Mongolian nomads, and Chinese settlers in southern Manchuria—to form the base for their conquest. As we can see, in early periods of empire there is usually considerable ethnic and material diversity. The empires in these examples, from their origins, also used techniques of indirect rule and multiple administrations, incorporating difference into their government structures and legitimating ideologies.

But in the later phases of imperial development, after expansion ceases, there is often a tendency toward inwardness, rigidity, and lack of creativity, and the empire often ends with a major disaster, produced by ignorance, lack of resources, and blinkered political discourse. These phenomena of narrowness and fragility correspond to the culmination of the K phase of the adaptive cycle. The early Ming dynasty is a good example, and the story of Ming policy toward its borders reveals this polarity between openness and closure.

Ming Expansion, Consolidation, and Decline

The Ming dynasty, after throwing off Mongol rule in the first half of the fifteenth century, expanded rapidly in all directions—both continental and maritime. The Yongle Emperor

(r. 1402–1424), a vigorous martial prince, invaded Mongolia five times and conquered Vietnam. He also launched the Zheng He expeditions, each of which carried over 25,000 troops and 250 ships; these expeditions were intended to awe the peoples of the southern seas with Chinese military might, collect important trade goods and intelligence information, and intervene in local politics. Zheng He's naval officers also collected exotic species, such as giraffes from Africa, for presentation to the Ming court. They expanded the geographic and biological knowledge of the Chinese elites.

During this period, the Ming orientation to the world was cosmopolitan. It inherited the aspiration for universal empire from the Yuan dynasty, and it incorporated foreign people into its social structure. Zheng He himself was a Muslim, and his sailors had intimate familiarity with the many seafarers of the southern seas. Yongle incorporated surrendered Mongols into his armies, and he enjoyed vigorous campaigning in the steppe. Yongle built the great capital city of Beijing as the Ming's second capital, balancing the orientation of the dynasty between the distinct regions of north and south.

Shortly after Yongle's death, the next emperor and his officials cancelled the Zheng He voyages, shut down coastal trade, and turned their attention to the Mongol threat in the northwest. In 1449, however, a later emperor suffered an embarrassing reversal when he led an ill-advised expedition into the steppes of Mongolia and was captured by the Mongol Khan. This could have meant the end of the dynasty, but the elites back in Beijing quickly reorganized the government and put the emperor's brother on the throne, subjecting the hapless emperor to virtual house arrest once he returned. After the mid-fifteenth century, the Ming became much more inward oriented and defensive toward the northwest, while it also tried to shut down trade along the southern coast. The result was a loss of resilience and diversity: "pirates" flourished in the form of illegal traders, while nomads who were refused trading relations launched raids to get what they wanted.

Once again the Ming imperial system faced crisis, but in the sixteenth century it reorganized itself for a second time. The *wokou* 倭寇 ("dwarf pirate") crisis of the mid-sixteenth century, which coincided with increasingly large raids by Mongols in the northwest, shows how a regime threatened with near-complete loss of control on its periphery can creatively

reorganize itself, assembling new elements to start a fresh phase of growth (Perdue 2013). The Ming court intensely debated policy toward the *wokou*. Moralistic agrarian Confucians asserted that the Ming should not tolerate foreign trade—legal or illegal—and that it should stamp out these smugglers and pirates. Other local officials realized two important things: first, that the Ming could not control the maritime coast, which was a mobile open area accessible to many different peoples, and second, that the "harboring hosts" (*wozhu* 窝主) among the gentry elite of southeast China provided the traders with warehouses, investment capital, and refuge from official crackdowns. The only possible solution was to negotiate with the traders and gentry elites by opening coastal trade, buying off the armed groups, and ensuring the prosperity of the southern coast. This cosmopolitan pragmatist solution, pioneered by the great Ming general Qi Jiguang, reduced the intensity of *wokou* raids. At the same time, in 1557, the Portuguese arrived on the southern coast looking for trading opportunities. At first they seemed to be no different from armed pirates to the Ming officials, but it is said that eventually they offered assistance in repressing the pirates, for which they were granted the leasehold on Macau. The Portuguese lease of Macau connected Ming China to the rest of the world, through the great silver flow that came from the mines of Latin America, across both the Atlantic and Pacific Oceans, through Manila, to Macau, and ultimately to the rest of China. This creative response initiated, or at least accelerated, the great commercial boom of sixteenth-century China.

On the other hand, the building of the Great Wall, which occurred during the culmination of Ming defense policy, further limited the dynasty's cultural perspectives. The costly wall reinforced static military positions, so combat skills declined. Since the Ming rulers had literally walled themselves off from the steppe, they lost crucial knowledge about Mongolian and Manchu political developments. Even though they issued trading licenses to rival Mongol leaders, they lost the ability to play those leaders against one another because they had inadequate intelligence.

The popular historical documentary film *Heshang* 河殇 (Yellow River Elegy), produced in 1987, stresses the isolating impact of the Great Wall:

The Great Wall of the Ming dynasty . . . was naturally much stronger than the Great Wall of the Qin and Han dynasties. And yet it too exhausted the strength of the Ming and greatly hurt its vitality. . . . The majestic section of the Great Wall at Gubeikou pass was built by the famous general Qi Jiguang [who rebuilt the wall in the north, and also built a Great Wall along the coast to defend against the Japanese pirates]. . . . Qi Jiguang was the most talented military strategist of the Ming dynasty, but he has also left us with a great regret: why was it that the pirates of an island country could cross the seas to attack China, [and] the Europe of that time possessed an armed navy that pursued conquest in all directions, while China could think only of rebuilding the Great Wall? . . . In 1588 Qi Jiguang died amid poverty and illness, [but] at this very time, the invincible Spanish Armada was about to set out to conquer England and to open up a tumultuous new page in the history of the early modern world. (Bodman, Su, and Wang 1991, 127–129)

Cosmopolitanism and Cooperation in the High Qing and After

The most famous phase of cosmopolitanism, marked by the arrival of the Jesuits, corresponds with the expansive era of Kangxi. The greatest success in consolidation occurred in the mid-eighteenth century, with the definitive conquest and administrative incorporation of Mongolia and Xinjiang (figure 4).
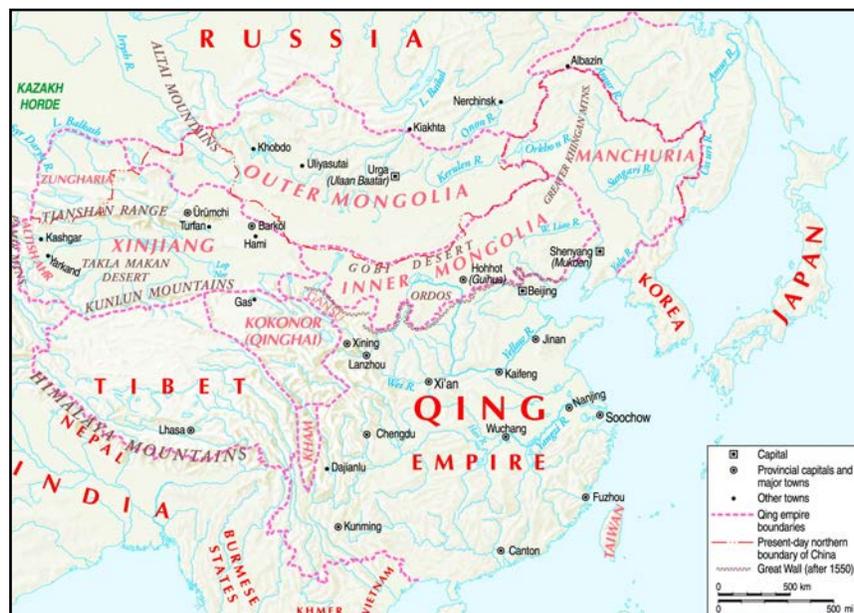

Figure 4. Map of Qing Empire at its maximum. *Source*: Perdue (2005, 2).

At the same time, some open-minded individuals took advantage of the expanded limits of the Qing Empire to explore new horizons. One of these was Ji Yun (1724–1805), a top-ranking scholar and official exiled to Xinjiang from 1769 to 1771 because of political intrigue. On his return to the capital from Urumqi, he wrote a series of poems describing the exhilarating landscapes he had experienced during his exile (Ji and Li 2010). A long tradition of exile literature, extending at least as far back as the Tang dynasty, featured literati who lamented their distance from the imperial capital and described their frontier surroundings as barren wastelands. Ji Yun was different: he seems to have enjoyed the rude and energetic development of Xinjiang during this period. In one of his poems, he celebrates the new land clearance undertaken by military colonies, which brought verdant crops to the oasis of Urumqi:

秋禾春麦陇相连

绿到晶河路几千

三十四屯如绣错

何劳转米上青天

Autumn grain and spring wheat spread along the furrows
It is green for several hundred miles down to the Crystal River
On the thirty-four military colony fields interspersed like embroidery
Everyone joins in to thresh the millet under the vast blue sky
(Ji and Li 2010, 144#24)

Ji's enthusiasm demonstrates that some Qing officials exulted in the new possibilities created by this unprecedented expansion of territory and cultural heterogeneity. Yet ominous signs that the imperial mind was narrowing had already appeared. The repression of Christianity under the Yongzheng Emperor (r. 1723–1735) in the early eighteenth century showed an intolerance of dissenting religious sects that appeared to threaten imperial control. Yongzheng also launched an obsessive campaign against the obscure scholar Zeng Jing, in which he attempted to root out anti-Manchu sentiment from the Han Chinese gentry class through indoctrination and repression (Spence 2001). The Qianlong Emperor in the mid-eighteenth century promoted the greatest compilation of classical texts ever assembled, in the *Siku Quanshu*

(Complete Record of the Four Treasuries) project, at the same time purging from the canon any texts that hinted at anti-Manchu sentiment (Guy 1987). In the strange "soulstealers" sorcery scare of 1768, the Qianlong Emperor tried to track down an elusive group of wandering rebels who, he claimed, were cutting off the queues of Chinese people to promote an anti-Manchu rebellion. Despite the best efforts of his bureaucrats and a culture of fear and denunciation generated by this initiative, he never found any genuine queue-cutting rebels (Kuhn 1990). The evernormal granary system (changpingcang 常平倉), which stored grain in all the counties of China to provide famine relief and price stabilization, expanded to an unmanageable size by the late eighteenth century, and much of the grain rotted from misuse or was diverted to other purposes (Will and Wong 1991). The frontier expansion of Han Chinese aroused great resentment both from native peoples who were displaced by the new settlers and from other Han migrants who fought with new migrants for land. A series of frontier rebellions broke out in the late eighteenth century, heralding the end of the flourishing age. In the eighteenth century, we find fascinating polarities between creativity and dogmatism, optimism and paranoia, and expansion and defensiveness, which characterize phases of growth and consolidation.

Many historians have argued that the "flourishing age" of the high Qing demonstrates a dynamism embedded in the classical system that could produce great achievements in economic growth, social mobility, and literary and scholarly production, along with military conquest. But we still have not been able to explain adequately why the glories of the flourishing age turned into the humiliating experience of the nineteenth and twentieth centuries. Perhaps the resilience concept will help illuminate the sudden transformation of the high Qing into the beleaguered "sick man of Asia" of the nineteenth century. Robert Marks concludes that "the Chinese empire had reached its ecological limits . . . and was becoming deforested and experiencing the effects of ecological degradation" by 1800 (Marks 2012). Although we cannot estimate precisely the "resilience" of the Qing imperial system at the end of the eighteenth century, it is clear that beneath the surface of impressive economic growth, advances in scholarship, and mobilization of resources for social welfare was a more fragile equilibrium, losing its ability to resist the impact of environmental and external forces.

Nineteenth-Century Crisis and Creativity

During the nineteenth century, the consequences of Qing China's declining resilience revealed themselves in a series of catastrophes, including losses to foreign powers, internal rebellions, administrative decay, and natural disasters. Yet even in this century of humiliation, the onset of China's "omega" phase, we can find intriguing examples of interpersonal and international cooperation aimed at relieving the empire's difficulties. One of these examples is related to coastal trade and central finance, the other to the drought-stricken interior and private philanthropy.

These institutional innovations demonstrate continued creativity as well as the limits to possible change within the imperial system. From the traditional Chinese point of view, they indicated the chances for dynastic revival (*zhongxing* 中兴). From our ecological perspective, they added some resiliency to the system without fundamentally challenging its structure. Both kinds of reforms arose from crises on the borders, closely connected to challenges of reforming the state in the new imperial world of the late nineteenth century.

In his classic first book, *Trade and Diplomacy on the China Coast* (1953), the Harvard historian of modern China John K. Fairbank described a process of intercultural negotiation that took place after the conclusion of the first Opium War. As a result of the treaties signed in Nanjing in 1842, the first of China's unequal treaties, China opened its treaty ports and allowed British consuls to be stationed in the ports and fixed tariffs to be levied on imported goods. Both the British and the Chinese had great difficulty controlling trade along the coast, because many of the goods, such as opium, were illegal and because the traders were unsupervised boat people who wanted to evade customs duties. But the two nations had a joint interest in making the treaty system work. The British wanted to promote the legal trade, as well as the opium trade, while Chinese authorities wanted to collect customs duties as best they could. For a while, Qiying, the Manchu negotiator for the Qing, and Henry Pottinger, the British representative, were able to work together for common interests. Qiying's approach was to stick to the limits of the treaty system while establishing close personal relations with Pottinger, in the classical spirit of "cherishing visitors from afar" (*huairou yuanren* 怀柔远人). He asked for a picture of Pottinger's wife and even offered to adopt his son.

But Qiying was soon replaced by Governor-General Ye Mingchen, who was much more hostile to Westerners, and Pottinger was replaced by John Bowring, who was first British consul in Hong Kong and then superintendent of trade in China. Bowring's hard-line advocacy of complete free trade echoed the arguments expounded by adherents to the Manchester School of political economy, such as Richard Cobden and John Bright. Then the confrontations between the two sides grew much more harsh. As the illegal trade grew, Americans competed with British in the opium trade, and trade spread beyond the treaty ports up and down the coast. The treaty system was on the verge of collapse by 1850. Yet the system was rescued, in Fairbank's view, by the establishment of the Chinese maritime customs in 1854. Robert Hart, an Irishman employed by the Qing court, set up a customs service with Chinese employees that was reliable, not corrupt, and efficient in delivering customs duties to the Qing state, while also enforcing payments on legal trade. Fairbank considered the maritime customs service, which lasted into the twentieth century, to be the prime example of "synarchy," a hybrid institution in which both the Chinese and the British cooperated. Even though it was part of an unequal, semicolonial relationship, it shows that the two sides could bridge a large cultural gap guided by the leadership of a few extraordinarily cosmopolitan individuals.

Chinese textbooks on modern history barely mention the maritime customs at all, and Western textbooks give them much less attention than they used to, but Fairbank's example demonstrates the possibility of creative reorganization of the foreign trade system in the late nineteenth century.[3] The customs service did not prevent the second Opium War in 1856, but it did provide vital revenue for the Qing modernization projects under the self-strengthening movement. It could stand as an example of adaptation that avoided a complete collapse of trading relations, through creative restructuring of Sino-foreign relations. Other provisions of the unequal treaties also performed a similar role. The historian Pär Cassel has argued in his recent book that the practice of extraterritoriality, or consular jurisdiction, was built on earlier Qing practices of multiple legal jurisdictions for Han, Manchu, and Mongol constituencies of the empire, and that Qing statesmen were able to use the provisions of the treaties to protect Chinese who lived abroad in Japan (Cassel 2012).

My second example—a more material one—illustrates an adaptive cycle that did go through a catastrophic boom and crash, one that was exacerbated rather than minimized by state action. The "incredible famine" (*qihuang* 奇荒) of 1876 to 1879 was the result of a three-year drought in North China, which led to the deaths of nine to thirteen million Chinese farmers in the five northern provinces of Shaanxi, Shanxi, Henan, Hebei, and Shandong. The famine itself was the culmination of a long period of decline that had struck this poor northern region since the eighteenth century. Shanxi was once a fairly prosperous region, with trade routes extending into Central Asia and famous bankers who financed commercial enterprise all over the empire. But the shift of trade routes to the coast damaged the areas dependent on inner-Asian trade, and the loss of strategic interest in the region after the completion of the eighteenth-century conquests meant that Shanxi and much of interior North China suffered from poor roads, underfinanced local administration, and low grain reserves to protect against drought. Its resilience had been severely undermined.

Just before the drought, in 1874, the leading officials of the self-strengthening movement, Li Hongzhang (1823–1901) and Zuo Zongtang (1812–1885), had debated the relative importance of allocating military and economic resources between the coast and the interior (Hsü 1964–1965). Li Hongzhang wanted to build up the Chinese fleets to face the rising threat of Japan, while Zuo Zongtang insisted on maintaining a large army to guard against expansion by Russia. In this debate, the two primary advocates of strengthening China's economic and military resources clashed with each other, but neither of them focused on North China itself. Zuo Zongtang won a great deal out of this debate, and he was able to use his powerful army to drive out the Russians from the Ili valley in Xinjiang in 1878. Li Hongzhang received part of the money he had requested for his fleet as well. But when the drought struck, officials and missionaries trying to deliver grain supplies to the regions found that the roads were so poor, they could not get the grain there quickly enough. The self-strengtheners had completely neglected to repair the road system of North China, because their primary goals were military and economic defense. The ecological priorities of the Qing state had shifted: no longer was its primary goal the preservation of the independent Chinese farmer; instead, armies, navies, and modern industry took precedence (Perdue 2005).

But the famine also called forth a tremendous outburst of popular mobilization for relief by both Chinese and foreigners (Edgerton-Tarpley 2008). In the lower Yangzi, prosperous gentry families donated relief funds, in money or in grain, and published small pamphlets depicting starving peasants, which they used to pull at people's philanthropic heartstrings. James Legge, the well-known translator of Chinese classics, also translated these illustrated pamphlets into English to help with fundraising in England and the United States (Committee of the China Famine Relief Fund 1878; "Tears from Iron"). Figure 5, a copy of one particularly graphic page from these pamphlets, depicts corpses abandoned on the roads being eaten by birds, and on the right indicates actual cannibalism. The money tree shown at the end of the pamphlet suggests all of the blessings the donor will receive in the next life if he gives money for relief (figure 6). The International Famine Relief Committee was one of the first international relief organizations (the ancestor of Live Aid concerts), and along with the Chinese gentry, these organizations occupied the role that the Chinese state could only partially fill. The participation in relief campaigns of gentry in cooperation with foreign donors represents a creative adaptation and merging of Confucian, Buddhist, and Christian cultures of charity in response to crisis. In sum, during the nineteenth century, the Qing social system continued to create adaptive responses to a series of severe challenges, giving the dynasty a surprisingly long duration in the face of nearly overwhelming difficulties.

Famine and the Adaptive Cycle in Twentieth-Century China

My final example of the insights provided by the adaptive cycle model comes from the twentieth century, focusing on the Great Leap Forward and the famine that ensued, from 1958 to 1961 (Harrell 2007). From today's vantage point, the Great Leap looks like a paradoxical combination of extreme modern rationalism and wild superstition. While party leaders aimed at rapid economic development based on the key technological achievements of the Soviet and Western model—coal and iron—peasants melted down their cooking pots to make backyard steel and destroyed the agricultural system in pursuit of impossibly high yields. In the political scientist James Scott's terms, it was a consequence of "high modernism" gone wild (Scott 1998).

BODIES LIE DEAD ON THE ROAD, AND THE LIVING STRIVE
TOGETHER FOR THEIR FLESH.

The superior man in ordinary times, while he eats
cooked flesh, has his shambles and kitchen away from his
hall; but in this year of famine, men eat one another.
Letters from the country tell us that if a body lie unburied,
the starving surround it, ready to rush on it with their
knives, and cut off the flesh for food. The dead died because
they could get no food, and the living seek now to prolong
their lives by eating the dead. Would you have them die
rather? What will not famine compel men to do?

Figure 5. Images of starvation and cannibalism. *Source*: Committee of the China Famine Relief Fund (1878).
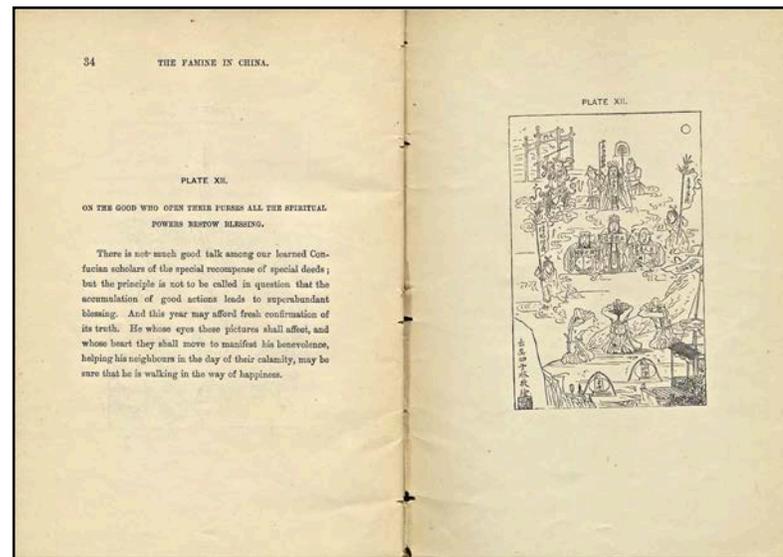

Figure 6. Blessing bestowed upon the generous. *Source*: Committee of the China Famine Relief Fund (1878).

Ecologists call it the primary error of "first stream science"—that is, bad engineering that ignores the interdependent properties of ecosystems (Gunderson and Holling 2002). The Great Leap tried to maximize short-term output of only two variables—grain and steel—while ignoring the relationship between these products and the rest of the system. The adaptive cycle struck back with a vengeance: nature was not impressed by communes, Mao Zedong and the Communist Party thought. Instead—as in the 1870s, but on a larger scale—famine struck large parts of China, with a death toll of at least thirty million people. We still do not understand the exact scope of the disaster, but in a recent book entitled *Tombstone* (*Mubei* 墓碑), the Chinese scholar Yang Jisheng has documented a great deal of the suffering, using archival sources. The German historian Felix Wemheuer, relying on oral histories and local archives, has reconstructed the famine's course through some of the most severely struck regions, and he has published a book comparing the Chinese famine to that of the Soviet Union in the 1930s (Wemheuer 2007, 2012; see also Yang 2012).

These studies provide a great deal of evidence that basic ecological principles were violated. Farmers increased the areas for cultivating grain by "deep plowing"—or turning over the soil two to three feet deep—a practice that created "mounds of poisoned earth" by destroying soil nutrients, and by investing in hasty and shoddy irrigation works with large amounts of mass labor (Yang 2012). Moreover, the emphasis on growing grain meant reducing the output of fish, vegetables, and other crops deemed "nonessential." Likewise, efforts to make backyard steel involved melting down local supplies of pots and pans and deforesting the countryside to create useless lumps of metal. The resulting famine represents a catastrophic "omega" phase of the agrarian cycle, and it was primarily caused by state action: the misallocation of human resources for misguided activity and the excessive extraction of grain to feed the urban population.

We may also note the rigidity imposed by nationalist ideology on state policies. Even when Mao and the ruling elite became aware of the severity of the famine, they refused to cancel grain exports sent to the Soviet Union to pay for China's industrial imports, because they believed doing so would be too humiliating, revealing China's failure to progress fast enough economically to outstrip the Soviet Union, as Mao intended. And since at the outset of the Great Leap in 1958 Mao had provoked a crisis with the United States by bombarding the islands of

Quemoy and Matsu held by the Nationalist regime on Taiwan, he had precluded any option for getting aid from the West.

Radical reorganization of the countryside occurred in the next phase, beginning in 1961. The communes were dismantled, private plots and market agriculture reappeared, and agricultural production recovered. But there were also damaging long-term ecological effects, especially deforestation and a proliferation of weak dams for water control. The bigger social effect was that the legitimacy of the Communist Party in the countryside was destroyed. No longer could the party convincingly claim to have brought prosperity to the Chinese people, except by suppressing all information about the famine and repressing all of its nonofficial critics. The economist Mao Yushi of Tsinghua University has recently calculated that China's per capita GDP was actually less in 1976 than in 1949, taking into account unreported losses due to famine (Mao 2012). His estimate may be an exaggeration, but it is at least somewhat plausible. It took another cycle of political upheaval and collapse, including the ten lost years of the Cultural Revolution, before the party under Deng Xiaoping could finally regain its position by allowing peasant farmers to openly pursue wealth without suffering political attacks.

How resilient is China now, after thirty years of the reform program? There is no doubt that the reform program begun by Deng Xiaoping has ushered in an extraordinary period of economic growth, lasting nearly three decades; as a result China's GDP has leapt to become second in the world. This development depends on yet another radical reorganization of the Chinese productive system, however, relying on new elements that were unforeseen by Deng and his planners. The most conspicuous of these are heavy dependence on foreign direct investment, exports from coastal factories to Western industrialized countries, and the massive flow of labor out of the countryside to factories on the coast. The latter constitutes one of the largest migrations in all of human history, and it could mean the end of rural China. By some measures, China is already at least 40 to 50 percent urban; if you include the rural migrants, up to two hundred million of them, in the urban count, that figure goes up to 60 to 70 percent.

Some optimistic analysts extrapolate from this period to predict that China will soon overtake the United States in GDP level. But one thing the adaptive cycle shows is that linear extrapolations are unlikely to happen. Rapid growth also brings with it internal strains and

concealed loss of resilience that eventually undermine the original sources of growth. So we should ask whether China is becoming more or less resilient over time, and whether it is generating enough intellectual resources, including cosmopolitan creativity, to handle its future challenges. So far, the response of the top leadership, and many prominent intellectuals, has been disappointingly unimaginative. Three brief comments will illustrate the limits on creative thinking in contemporary China.

First, the political system is closed. Despite the call of former Premier Wen Jiabao for political reform, echoing that of Hu Yaobang and Zhao Ziyang in earlier times, the party as a whole seems devoted primarily to preserving its power position, not to responding to popular pressure. We have just seen the meteoric rise and fall of Bo Xilai, a man who enthusiastically promoted the collective singing of Mao songs. Invocation of totalitarian nostalgia for the 1950s combined with nationalist victim narratives is the party's last resort for gaining credibility.

Second, environmental pressures are increasing. There has been a constant lack of water for North China, and the response to this decades-long drought has been not to push water conservation, but to create even larger engineering projects, like the great transfer of water from south to north (Nanshui Beidiao 南水北调). This is a broad technological solution aimed at keeping the existing system in place, with dense populations and high levels of water usage in cities and farms, still based on policies of developmental modernism reminiscent of the 1960s.

Third, China is much more dependent on the outside world for resources and markets than ever before. It can develop only in an open trading order, where it is free to export its products based on cheap labor and to buy the energy resources it needs for industrial growth. The United States is still by far the world's dominant military and economic power, and its presence in Asia ensures stability. But there are ominous signs of patriotic frenzies expressed on the Internet and in public demonstrations—including, in particular, attacks on Japanese people and sometimes on Americans. The understanding of modern Chinese history as nothing more than a tale of unilateral victimization of China by rapacious foreigners stokes emotions but radically distorts the complex story of the past. This view leaves no place for a Robert Hart, or even a Li Hongzhang, who signed treaties with Japan and the West in order to enable China's modernization. It celebrates the violent, superstitious Boxers and other radicals who endorsed

vengeance and destruction, at the expense of reformers, cosmopolitan intellectuals, and transnational businesspeople.

The ongoing cultural war over China's modern history pulls its contestants in contradictory directions. Mao Yushi (1929–)—the nephew of one of China's most famous engineers, Mao Yisheng (1896–1989)—for example, trained first as an engineer at Shanghai Jiaotong Daxue and later studied economics. In his youth, he says, he was "boundlessly loyal" to Mao Zedong, but he was jailed as a rightist in the 1950s for criticizing the policies leading to the Great Leap Forward. In 2011, he published an online article entitled "Restore Mao Zedong as a Human Being," which savagely criticized Mao as a selfish, domineering, even insane autocrat who caused the deaths of fifty million people by launching the Great Leap Forward and a constant series of violent political campaigns and never felt the slightest bit of remorse. The article was quickly taken down, but it had already circulated widely. Following this, ten thousand leftist scholars, including the niece of Mao Zedong, presented a petition demanding that Mao Yushi be fired, and others threatened to beat him up. In 2012, he was awarded the Milton Friedman Prize for Advancing Liberty by the Cato Institute in Washington, DC. Mao Yushi has also advocated enacting taxes and other measures to lower China's carbon emissions, and he has openly declared that China must sacrifice some of its rapid GDP growth rate in order to address deep environmental crises. Mao Yushi represents a more cosmopolitan, international perspective than his critics, who invoke Mao Zedong as their model, but the controversy over these two approaches to sustainability and economic growth has become quite heated in recent years.

On the one hand, if the Great Leap Forward and the Cultural Revolution represent the periods of China's maximal isolation from the world, and if, as former Premier Wen Jiabao has said, the "pernicious influence" of the Cultural Revolution still survives in China today, then China is still threatened by a rising tide of totalitarian nostalgia evoking a utopian image of the socialist years. On the other hand, intellectuals from the international tradition of free thought reaching back to the late Qing dynasty still advocate studying "problems not isms" (Mao Yushi, echoing Hu Shi), and empirical approaches to pressing issues of environmental preservation, social justice, and political freedom. In the past, China has developed the most when it creatively adopted elements of cultural traditions originating outside the Han core, including Central Asian

military and administrative practices, Western technology and bureaucracy, and foreign capital and culture. No one can predict the future evolution of the Chinese system, but we can guess that greater openness to innovation in cultural and intellectual arenas will increase the resiliency of the system and its ability to respond creatively to future challenges.

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Notes

1   This paper is based on keynote lectures given at the "Conference on Cosmopolitan China," Manchester University, May 16, 2012, and at the "Bordering China: Modernity and Sustainability" conference, UC Berkeley, July 31, 2012.
2   Holling's model is one of a number of efforts to theorize the operation of complex adaptive systems. For a general discussion of the biosphere as such a system, see Levin (1999).
3   For a recent study of the maritime Customs in the twentieth century, see Brunero (2006).

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