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## EAST ASIAN HISTORY AND CULTURE REVIEW

### REVIEW ESSAY

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#### **Water and Power in Twentieth-Century North China**

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David A. Pietz. *The Yellow River: The Problem of Water in Modern China*. Harvard University Press, 2015. 384 pp. \$40 (cloth).

Micah S. Muscolino. *The Ecology of War in China: Henan Province, the Yellow River, and Beyond, 1938–1950*. Cambridge University Press, 2015. 310 pp. \$88 (cloth); \$44 (e-book); \$30 (paper).

The Yellow River is by far the largest waterway in northern China. Its basin, broadly construed, is home to roughly 400 million people (though most depend on other water sources) and about 40 percent of China's farmland;<sup>1</sup> that basin's middle and lower reaches have been densely populated for over 2,500 years. The river also poses unusually severe technical problems, partly because of the large fluctuations in its water supply, but mostly because its water carries the largest silt burden per cubic meter of any major river in the world (approximately sixty times that of the United States's "big muddy," the Mississippi). Or, as David Pietz puts it, comparing the Yellow River to the Amazon, Nile, and other huge rivers, "no other region has required as much investment to retain some semblance of ecological equilibrium as the North China Plain" (133). Consequently, for as long as there has been a recognizable Chinese state, the management of the Yellow River has been seen as a major indicator of its performance.

These ecological conditions have long meant that, even when the state has made major efforts, managing the river has been a Sisyphean task. This was especially true before the availability of cheap steel, concrete, and power-driven dredging equipment, but it is still more or less the case today. Consequently, the significance of a given episode in the history of Yellow

River control will often shift with the length of time considered. What appear at first to be spectacular achievements can appear as wasteful failures a generation later: the Sanmenxia Dam, completed with much fanfare in 1960 and a silt-clogged failure by the 1990s, is just one case in point. Conversely, projects that fell victim to a lack of funds or political instability in the short term may eventually be remembered for having pioneered new approaches more successfully implemented years later. Consequently, there is much to be gained by placing the two excellent books under review here side by side and asking how the characteristics of Yellow River control that Micah Muscolino emphasizes for the brief but critical period of 1938–1950 look across the longer timespan that Pietz discusses.

Pietz's *The Yellow River: The Problem of Water in Modern China* is a big book on a big topic, presented with admirable clarity. In two brisk initial chapters, Pietz lays out the problems presented by the Yellow River and by hydraulic management in North China more generally, how the Ming and Qing handled those problems, and how long-standing institutions and procedures for managing the river fell apart in the last century or so of the empire. Much of this section, inevitably, draws on existing scholarship, and is therefore less original than what follows; it is, however, an excellent synthesis. Pietz explains clearly the major environmental and sociopolitical pressures behind water management, the two major schools of thought that developed, and the problems inherent in each approach (50–53). He then quickly considers the reasons why Chinese officials were overwhelmed by the economic, political, and environmental crises that hit the Yellow River basin in the nineteenth and early twentieth century.

Bad luck played a role in this decline, in the form of an unusually warm and wet climate, but the accumulated pressures of upstream deforestation and erosion, continually raising the riverbed, mattered more, and were more or less inevitable. An ever-increasing risk of an ever-more-threatening flood therefore led to what Pietz, following Mark Elvin, calls “hydrological lock-in” (68–69): a situation in which there was no alternative to spending more and more money in a desperate attempt to postpone catastrophe, even as the amount of safety purchased for each additional *tael* of spending declined. The catastrophic floods of 1851–1855, which ended with the river shifting course, allowed the Qing to escape these fiscal pressures, and—despite the enormous suffering this choice entailed—a state hard-pressed on other fronts took the opportunity to scale back its commitment to river control.<sup>2</sup> With other antidisaster measures, such as emergency granaries, also greatly weakened—a process that had already begun by the

end of the eighteenth century but accelerated later (Will and Wong 1991)—China suffered unprecedented disaster mortality in the last few decades of the Qing and the Republican era.<sup>3</sup>

Ironically, these disasters occurred at more or less the same time that new techniques and materials were emerging elsewhere in the world that made more effective control of turbulent rivers at least imaginable, if not immediately practicable. The combination made the Chinese state—and to some observers, China more generally—seem shockingly passive in the face of acute distress, largely obliterating memories of how engaged and relatively efficacious it had been in the early modern period.<sup>4</sup> This, Pietz notes, is the era in which China (mostly northern, and above all northwestern, China) became fixed in the minds of Westerners as “the land of famine”; and, while Westerners were wrong to think that this had been China’s condition since time immemorial, they were right to think that modern engineering was an essential part of any solution. By the early twentieth century, many Chinese recognized this as well; however, that did not mean that anyone knew exactly how to apply modern engineering to the problems, much less that they had the means to do so. This is where Pietz’s main story begins.

Chapter 3 covers water politics, in the broadest sense, during the Republican era. Here Pietz skillfully interweaves multiple themes and varied kinds of history. On the one hand, we have what William Kirby has called “the internationalization of China” (Kirby 1997): the increasing importance of foreigners, foreign-trained Chinese, and foreign ideas across a wide range of Chinese issues. The influence of Western engineers obviously stands out in this regard, and Pietz is careful not to treat them as a monolith: he provides a useful account of the different schools of thought among Western (principally American and German) engineers, the ways in which Chinese responded to and participated in the resulting disagreements, and the role that Yellow River engineers from multiple backgrounds played in developing—not just implementing—new ideas about water control. As he did in his first book (2002), Pietz also shows how changing approaches to water management were intertwined with both domestic politics and imperialist rivalries, and with a profound shift from thinking about rivers solely in the context of agricultural and transportation needs to thinking in terms of “multipurpose” projects, in which hydroelectricity for industrial development became increasingly central (92–94). The book shows how the politics of planning both encouraged and shaped a new, more technocratic approach to water management that has, in many ways, remained ever since. At the same time, though, he emphasizes that it was not until after 1949, or perhaps not even until after

the Cultural Revolution, that the technocrats had fairly consistent success in overriding the provincial and local interests that stood in the way of their projects (134–136, 176–187, 237–238). And while he notes that central planning was often tied to military concerns, he frames his story around the rise of technocrats, rather than around what Muscolino calls the “militarization” of river control: he thus largely skips over the mobilization of forced labor on Nationalist-era projects,<sup>5</sup> emphasizing the incomplete implementation of plans rather than how the partial implementation that did occur was carried out.

Pietz, does, however, provide a thoughtful discussion of a different kind of politics and mobilization, targeted at people throughout China, and aimed at motivating sacrifices well beyond performing manual labor on river works. He devotes considerable attention to the symbolic importance of the Yellow River, of the river valley as the supposed “cradle of Chinese civilization,”<sup>6</sup> and of the demonstrated ability (or inability) to manage that river in different versions of mass nationalism that emerged during the Republican era. The promotion of these sentiments went far beyond the government, as intellectuals ranging from poets to archaeologists also placed the Yellow River at the center of Chinese identity, and argued (against much of the evidence) that civilization had diffused outward from the North China plain, not only to the rest of China proper, but to contested regions such as Inner Mongolia and Xinjiang (99–104, 110–114). Once the Chinese Communist Party (CCP) was settled at Yan’an—and was joined there by intellectual refugees from the Japanese invasion—it too promoted this northern, peasant-centered vision of Chinese history and identity. The status of the North China peasantry became perhaps the most crucial public measure of a regime’s success or failure, and that same peasantry came to be seen as the wellspring of an authentic “Chinese nation” whose united will was the key to the nation’s salvation.

And in the longer run, the CCP benefited from that vision much more than the Nationalists did. Whereas the Nationalists largely abandoned North China during the war against Japan, it became the CCP’s base; thus, equating the Yellow River Valley with China’s “heartland” clearly worked in favor of the latter (102–114). Pietz’s discussion of how the CCP repaired the Yellow River dikes in Henan after they captured the region during the civil war, and the propaganda value of those repairs, is particularly good, and forms a valuable bookend to the better-known story of how the Nationalists hurt their image by deliberately unleashing Yellow River floods to slow the Japanese advance in 1938. (Pietz tells that story briefly, too; and it is

discussed at length in Muscolino's book, which also provides more details about how different the reality of postwar repair was from this CCP-promoted image.)

Both physical efforts to harness the Yellow River and symbolic efforts to make it serve political agendas accelerated further after 1949. Pietz's next two chapters provide an excellent history of flood control, hydroelectric dam construction, and irrigation efforts on the North China plain from roughly 1949 to 1976, but with particular emphasis on the late 1950s. In this era, Pietz argues, Chinese water control took a distinctive turn, combining elements of a centralized, technocratic approach heavily influenced by Soviet methods and a more populist (my word, not his) approach which was based on mass mobilization of peasant labor and incorporated considerable local initiative, often directed by people with little or no formal training (174–182, 187–193). By highlighting local *initiative* in this way, Pietz gives us a different impression of the significance of mass mobilization for river control than we get from Muscolino's concept of the "militarization" of such work—the latter emphasizing top-down influence on mobilization, if not necessarily complete control.

Among other things, Pietz shows us how much of the approach to mass mobilization and labor-intensive construction that we associate with the Great Leap Forward was already central to the massive irrigation efforts of the mid-1950s, including similar kinds of propaganda appeals, use of labor models, and so on. Yet while the Leap was an almost unmitigated catastrophe, starving millions while creating few gains, the irrigation campaign left a much more complex legacy. And that legacy was enormous.

In early 1957, Pietz estimates, one in six Chinese was digging irrigation channels or reservoirs (191). The irrigation campaign was often coercive—though some efforts were also powered by genuine enthusiasm—and it was also extremely wasteful, in both the short and the long term. Many dams were built that soon crumbled or needed repair; the irrigation systems that were designed often used large amounts of water for each drop that got to the crops' roots; and, partly because so much water was used for each liter of effective irrigation, large areas of farmland became waterlogged and saline, requiring substantial reengineering of irrigation systems in the 1960s and early 1970s.<sup>7</sup>

Yet, in spite of these caveats, and in contrast to the Great Leap, the irrigation campaign also had huge benefits—especially if we extend it to include the adjustments made over the course of the 1960s. It made it possible to roughly triple agricultural yields in North China

between the 1950s and the 1980s, making the region a net exporter of food for the first time in over a millennium (even as its population roughly doubled).<sup>8</sup> This story, then, demands a more complicated assessment of the ultimate historical significance of Maoism than do episodes like the Great Leap or the Cultural Revolution, and Pietz handles this skillfully. As post-1949 archives have opened, the history of the 1950s has become a boom area, but most of that work has been firmly focused on China's cities. I would rate this as one of the most important books about the post-1949 countryside to emerge so far from the opening of PRC archives.

The last chapter of Pietz's book looks at the post-Mao period: an era of unprecedented growth that required the basic food security and other fruits of what Pietz calls "re-plumbing the North China plain" under Mao, but also an era in which the environmental recklessness of much of that construction became increasingly unmistakable. In short, while engineering largely solved the region's flood problems, at least for a while,<sup>9</sup> it provided no fundamental solution to the region's water *shortage* problems. And in the modern era, these shortages have become more important than flooding problems; today they are chronic, rather than a matter of year-to-year weather fluctuations.

Drilling deep wells in the 1950s, 1960s, and 1970s bought a generation of respite from those problems, but the extra time which those wells purchased is now running out, while greatly increased water pollution (largely thanks to industrialization) and soaring demand (due both to population growth and increased prosperity, enabled by the wells themselves) have ultimately intensified the problems. Pietz provides a brief but excellent account of the components of major contributors to the current North China water crisis: wasteful irrigation design, institutional factors that make antipollution enforcement weak, and the basic, unfavorable background of the region's resource endowments. (Its per capita water supplies are about 6 percent of the global average.) Without being sensationalist, Pietz lays out the ways in which multiple problems—degraded water quality, quantitative shortage, soil salination, and so on—are interconnected and preclude simple solutions; as he quite rightly notes, "incidents" involving disputes over water have become extremely common in recent years. He then turns to the further "re-plumbing" now under way: a complex river diversion scheme (the biggest construction project in history, if it is ever completed) to move 48 billion cubic meters of water per year (roughly the volume of the Yellow River) from central and southern China to the North China plain, in part via the Yellow River itself. While neither the unpredictable results of this project nor contemporary policy

debates more generally are central concerns of the book, Pietz frames the issues helpfully, explaining where the challenges that might tempt one to try such an expensive and risky project come from, and explaining how a set of political institutions and cultural expectations have developed that make such a megaproject seem a more logical choice to Chinese policy makers than we might expect it to be.

Pietz then leaves us with two final twists. On the one hand, he shows us the recent reemergence of people who were criticized and purged in the late 1950s for their skepticism about the crash development of water control infrastructure, some of whom reemerged in their old age as important voices of caution about, or outright opposition to, current megaprojects. (One such person, Huang Wanli, was rehabilitated in the 1980s and played an important role as a critic until his death in 2001. Zhang Guangdou, a key engineer on both the Sanmenxia and Three Gorges dams, admitted in 2004 that Huang had been correct in his 1957 critique of Sanmenxia, for which he was labeled a rightist. Huang died in 2013 at age 101.) Secondly, he reminds us that China's environmental problems are part of an "internationalization of China" quite different from that of the early twentieth century. Most people probably think about this in terms of China's greenhouse gas emissions and their effects on the global climate, but this book reminds us that North China's water problems also have serious international dimensions. Some people talk about the possibility of further water diversions, tapping rivers that currently flow out of China: nine of Asia's ten largest rivers, serving over 40 percent of the world's people, start in Tibet. Others talk about what would happen if, in the absence of big new sources of water, China were to curtail irrigation in North China and vastly increase its demand for food from the rest of the world. The potential implications of these problems are, in short, enormous, and Pietz has placed them expertly in historical context.

Micah Muscolino's *The Ecology of War in China: Henan Province, the Yellow River and Beyond, 1938–1950*, deals with a briefer time period than *The Yellow River*, but in some ways the book is just as ambitious. Merely establishing the basic narrative must have been challenging: Henan was a particularly chaotic place during World War II and the Chinese Civil War that followed, people at the grassroots level were often reluctant to tell any of the armies fighting over the province the truth about their circumstances, and those competing authorities were often more interested in telling a story that flattered themselves than a story that reflected reality. Moreover, like Pietz, Muscolino gives us an environmental history that is also a social, economic,



cultural, and especially political history, raising fundamental questions about both the Guomindang (GMD) and the CCP.

The story Muscolino tells us is to some extent familiar. In June 1938, with Nationalist forces reeling from Japanese offensives, GMD forces destroyed dikes on the Yellow River near Kaifeng, diverting the river back toward its more southerly, pre-1852 course. This cut the Long-Hai railway (the only substantial east–west line in northern China) and created vast swamps that halted Japan’s mechanized infantry. This delayed the Japanese capture of the key railway junction of Zhengzhou; the delay was a matter of only several weeks, but it allowed many defeated Chinese troops to retreat safely, and an orderly evacuation of the temporary capital at Wuhan to take place. Had Wuhan fallen more quickly, it might have been fatal to the Nationalist war effort; given the final outcome of the war, one might argue that what looked at the moment like a futile sacrifice of civilian lives paid off when viewed on a longer time scale.

Whatever the military benefits of the flood may have been, they led to vast amounts of suffering, especially in Henan. Perhaps 800,000 died in wartime flooding; somewhere between 1 and 2 million people fled. The loss of farmland also exacerbated the 1942–1943 Henan famine (though the immediate trigger of that disaster was drought), the worst China would suffer in the eighty years between the great drought of the late 1870s and the Great Leap Forward at the end of the 1950s.

Unwilling to risk the blame they would have incurred for unleashing this disaster, the Nationalists insisted that Japanese bombs had caused the dike breach; when the true story became known after 1945, the resulting anger helped undermine the GMD in its struggle with the CCP. Meanwhile, the CCP–GMD struggle hobbled postwar efforts (heavily aided by the United States and United Nations) to restore the river to its pre-1938 course and rehabilitate the region’s farms; ultimately, that was accomplished only after the Communist victory. This much is not new.

However, Muscolino goes beyond this basic story in original and illuminating ways. Perhaps most importantly, he shows us the 1938 flood as not just a *moment* of disaster, but a key point in an ongoing catastrophe, with all sorts of effects that unfolded over time. For instance, the river became wider and slower in its new channel, so that sedimentation increased, and the riverbed rose rapidly. Thus, in contrast to any natural restoration of equilibrium that might be inadvertently suggested by saying that the river itself “established its new bed” or “carved a new

channel,”<sup>10</sup> flood control along the river’s new course immediately required major efforts. The slower-moving river’s increased sedimentation also raised the bed of the Huai River (into which some of the floodwaters flowed) and thereby blocked some of its tributaries; in succeeding years, they also flooded repeatedly (55–56).

Other effects worked across larger distances. For instance, many refugees from the flood resettled in Shaanxi, and a number of them reclaimed hillside land that had been overcultivated in the early and mid-nineteenth century, and had been slowly recovering after the Muslim rebellions of the 1860s and 1870s depopulated the region. As the wartime refugees cleared trees to make farms, Shaanxi’s forested area dropped from 25 percent to 16 percent during the war; in other words, the amount of forested area declined by over one-third, which is the sort of decline one might normally expect to take decades or even centuries in an agricultural society. Partly because of this rapid land clearance, rapid erosion followed, and ecological disaster returned to the region (81–85). Back in Henan, damage to farmland (from deposition of coarse, sandy sediment) and reduced labor power meant that harvests were significantly lower even after the waters were gone—making the 1942–1943 famine even worse than it would have been otherwise (91).

Muscolino describes the flood, its aftermath, and the human responses to it in terms of energy, and he places these energy flows in the context of the simultaneous energy demands of war. Indeed, the “metabolism” of armies and other social institutions constitutes one of his main categories of analysis. While the analysis of social metabolism is not new in the broader literature of environmental history, it is more or less new to the field of Chinese history; most histories with this perspective have focused on industrial societies. Meanwhile, Muscolino offers us a crucial reminder that, despite the use of planes, tanks, and other modern weapons, the Second Sino-Japanese War of 1937–1945 was largely fought with, and over, organic materials. Wood for both fuel and construction figured prominently, on both sides, as did the labor of domestic animals and the fodder required to sustain it. (Cotton, not discussed here, was also a major object of Japanese requisitions in North China.) Perhaps most important, all the armies involved found that obtaining enough food for themselves was a continuing problem—even greater than it was for the armies fighting over Europe.<sup>11</sup> And since most of North China had only scant surpluses of food, little timber, and barely enough labor animals for basic plowing and

transport to begin with, these additional energy demands led to frequent, often deadly breakdowns in the metabolism of local societies.

In Henan itself, Muscolino reminds us, undoing the damage of the floods required vast energy inputs; restoration was not simply a matter of waiting for the floodwaters to go down, or even of building new dikes. In many places, thick vegetation that had grown on abandoned land had to be cleared; some farmers returning after 1945 found over 10 feet of mostly infertile sediment on their land (174).<sup>12</sup> Little could be done about this during World War II, though Nationalists, Communists, and Japanese all made some attempts to boost production in the areas they ruled. (Communists, meanwhile, benefited militarily from the changed landscape, which was well suited to guerrilla warfare.) It was not, Muscolino shows us, that efforts were not made—one newspaper estimated that levies for Yellow River maintenance in Henan actually exceeded all other wartime extraction (134)—but they remained inadequate to the huge tasks involved. For one thing, they consisted almost entirely of human labor used to move local materials (mostly earth)—over 90 percent of expenditures went to food for laborers, by one account (137). If correct, this would make wartime river works even less capital intensive than they had been during the Qing; and work done in this manner would inevitably require continuing labor inputs that were not necessarily available. The work was also uncoordinated and therefore inefficient, since cooperation across the war's battle lines was rare.

After the Japanese surrender, the direction of energy flows reversed for a time. Relief agencies repatriated some of the refugees who had fled and provided grain to sustain them as they struggled to reclaim their farms; the United National Relief and Rehabilitation Administration (UNRRA) brought in tractors and fuel, so that the clearing of wartime damage did not depend entirely on that labor (197–199). But problems of coordination remained, as the Yellow River had become the CCP–GMD border in this region by late 1946. Despite significant achievements, stabilization of the river could not be completed, and suspicions that politics determined which lands were protected or flooded undermined trust in these efforts (202–203). Once the CCP had undivided military control of the area, the pace at which refugees returned quickened—assisted by CCP tax relief, subsidized loans, and other assistance—so labor again became plentiful. But modern inputs were scarce, and full recovery still took years (221–235).

This account highlights the intersection of military and environmental history. Muscolino thus places Chinese experiences in dialogue with a growing literature on the environmental

history of war (and preparation for war elsewhere, from defensive flooding unleashed by Confederates in the U.S. Civil War and both sides in the struggle between French and Viet Minh forces [239–241] to environmental studies of World War II supply chains [7–8]). Above all, Muscolino emphasizes two distinct ways in which Yellow River control was “militarized” in the period he studies here: the central role of military considerations in shaping demands on this region, and the militarization of the river work done in the region during these years. Both kinds of militarization, he argues, continued through the Great Leap Forward and beyond, part of a long-term “history of militarization in modern China that spanned from the 1850s to the 1970s” (emphasis added), or from roughly the Taiping Rebellion to the death of Mao Zedong.<sup>13</sup>

The primacy of military considerations in overall planning was, of course, most dramatically manifested in the deliberate destruction of dikes to slow down opposing armies. But it arrived earlier, and lasted longer, in subtler forms, such as the increased focus in river work on hydroelectric power for heavy industrialization, sometimes at the expense of flood control. More generally, it might include a broader shift in Qing and twentieth-century policy making that prioritized regions that were contested by foreign powers and/or thought to be promising bases for industrialization, rather than the areas most in need of state support to maintain ecological and social stability. This is a trend that some of us have pointed to as beginning in the nineteenth century (Pomeranz 1993; Halsey 2015), but that accelerated under the stress of World War II: rather than merely neglecting this region, the Guomindang actively sacrificed it, as the CCP (and various other powers) would do in pursuit of hydropower, nuclear testing grounds, and other accouterments of modern power.<sup>14</sup> But compared to some of these other sacrifice zones, eastern Henan was exceptionally densely populated and imbued with powerful Nationalist symbolism; nor was there any physical reason why it had to be permanently sacrificed, like areas submerged by dams or made radioactive by parts of a nuclear complex. On the contrary, Nationalist imperatives required its restoration. In that sense, the epoch of militarization in this region ended early in the Maoist period, and affected it intensely for only the dozen years mentioned in Muscolino’s title.

But other aspects of militarization lasted longer. These related as much to how river work was done as to what was built (or unbuilt). Here Muscolino emphasizes the mass mobilization of labor (which Pietz also describes as “highly militarized” [208]), through both coercion and propaganda, top-down decision making, and a suspension of critical thinking and intolerance of

dissent. As he emphasizes in his conclusion—overlapping here with Pietz’s argument—these were very much features of 1950s water projects, and of the Great Leap (243–246), which was particularly aggressive, and deadly, in Henan (Domenach 1995; Thaxton 2008; Yang 2012).

Unlike Pietz, Muscolino does not touch on the post-Leap period, much less the post-Mao epoch. Nonetheless, it is worth considering to what degree his narrative of “militarization”—very helpful for the period he covers—may be useful for thinking about water control beyond 1961, and even beyond 1976. Juxtaposing it to Pietz’s preferred rubric for the period of the last eighty years or so—the rise of “technocracy”—thus seems a worthwhile way of closing this essay.

The two concepts overlap to a significant degree. Centralized and often secretive decision making, a taste for megaprojects, an emphasis on hydropower, frequent indifference to environmental concerns, and intolerance for dissent are features of both technocracy and militarization, and of both late Maoist and post-Maoist water politics. (Criticism of major water projects is less perilous than it once was, and sometimes even achieves its ends, but it is still personally risky and only occasionally effective.<sup>15</sup>) But beyond that, the picture becomes less certain.

A sense of great urgency surrounding key water projects, as is characteristic of military campaigns, has certainly persisted beyond the death of Mao; so too have the commandism, duplication of effort, and waste characteristic of wartime (when getting the job done is vastly more important than getting it done in the most cost-effective way). The increasing amounts of capital equipment and high technology that are essential to Yellow River control and other water projects<sup>16</sup> are hardly inconsistent with militarization in what is now a highly industrialized society. And while the much-diminished role of the mass mobilization of labor, and an ethic of self-sacrifice, certainly differ from the kind of “militarization” Muscolino depicts, this may say as much about the way that the Chinese military itself has changed in recent decades as about any move away from a militarized approach to water control.

Perhaps the most difficult issue to parse in these terms concerns the varying roles of local actors in China’s water politics. In the Maoist period, as Pietz notes, there was a clear and repeated oscillation between more centralized periods of water management, emphasizing grandiose, multipurpose projects useful for industrialization and for building national pride, and locally based projects, usually focused on irrigation. The latter hardly fit with a purely technocratic model but are not inconsistent with a “militarized” one, given the semi-professional,

semi-guerrilla style of the Maoist military. “Local initiative,” we should remember, did not necessarily mean “voluntary” initiative (208), though it seems likely that people did genuinely favor the digging of wells and ponds for local irrigation over projects imposed in the name of basin-wide planning.

Since 1976, however, the meaning of centralization and decentralization has become more complicated. On the one hand, fiscal decentralization has given local governments more power to pursue their own priorities, which now often include an emphasis on local economic development over the enforcement of clean water (and air) mandates from Beijing. Efforts to undo that kind of local autonomy have so far had only limited success (Pietz 293–296). At the same time, the ever-increasing sway of the price mechanism in post-Mao China—an important concomitant of decentralization—dictates that reductions in water allocation should target agriculture, rather than industry or urban consumers, since the same gallon produces far greater economic output in industry than in farming. And since efforts to reduce inefficient rural water have thus far proved inadequate to solve North China’s water shortages—despite significant achievements<sup>17</sup>—Beijing is betting heavily on the centrally planned South–North Water Diversion to expand supply. This is a technocratic approach if ever there was one, shorn of any Mao-era “Chinese characteristics.” (There is no mass mobilization of labor to help build it, for instance.) It is proceeding despite serious doubts about many of the project’s technical aspects, opposition from many of the huge numbers of people to be displaced, and already-enormous cost overruns. So are many large hydropower projects, driven by desperate needs for electricity and the obvious problems with a continuing reliance on coal; many of these are on international rivers and have potentially worrisome implications for the downstream countries. Some political analysts therefore fear another kind of “militarization” of water control: the possibility that impoundment or diversion of rivers starting in China could lead to war.<sup>18</sup>

Setting that grim and currently unlikely possibility aside, where do the stories of attempted Yellow River control told by Pietz and Muscolino leave us? On one level, Pietz’s tale of long-run transformation clearly takes us to the present, with the technocrats very much in charge, but not necessarily in control. Muscolino’s story seems at first to belong more firmly to the past. On today’s Yellow River, water shortages and water pollution have clearly become more pressing than the imperatives of flood control that were dominant for so many centuries; threats from foreign invaders or civil war have become remote; and even the symbolic centrality

of the Yellow River and the North China peasantry in Chinese nationality and culture are much reduced in an era focused on cities, technology, and “blue water” links to the world beyond China’s borders (Friedman 1994).<sup>19</sup> Yet, in an age in which human decisions—often based on the short-term pursuit of power—may shape even the broadest long-standing background conditions of human societies, Muscolino’s account of unintended consequences, incomplete reversibility, and destabilized environments is also a story of more than just historical interest.

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### Notes

- 1 Definitions and therefore numbers vary, but cluster around these figures. See Varis and Vakkilainen (2001, 94).
- 2 On the fiscal pressures involved, see Dodgen (2001); on the state’s new priorities and the price paid by residents of neglected parts of North China, see Pomeranz (1993).
- 3 For quantitative estimates, see Xia Mingfang (2000, 78–79, 400–402).
- 4 On Qing famine prevention, see Will and Wong (1991). On the attribution of eternal passivity in the face of crisis to the whole of Chinese society, rather than just the state, see Fuller (2011).
- 5 See, for example, Pomeranz (1993, 253–266).
- 6 Archaeologists today, especially those based outside the PRC, are more likely to think in terms of multiple “cradles.”
- 7 For salination through excessive irrigation in Hebei, see Li (2007, 369). For Shandong, see the data in Shandong sheng nongye quhua weiyuanhui bangongshi (1982, 23–24), which suggests that despite the huge irrigation efforts made in the late 1950s, aggregate annual damage from floods began falling sharply after 1964, and damage from drought after 1971.
- 8 Pietz provides a per-acre figure for 1984 that is 274 percent of the 1953 figure; the number of acres cultivated rose as well. More recently, acreage has declined a bit, while yields continue to rise.
- 9 For a brief summary of contemporary flood threats, see Li (2003, 16–21).
- 10 The phrases in question, both describing the 1850s Yellow River shift, come from Leonard (1996, 49) and Spence (1990, 185)—neither of whom, clearly, intends any such thing.
- 11 See, generally, Collingham (2011). The Western Allies and eventually the Soviet forces as well (who often fought hungry until increased Lend-Lease shipments began to arrive in 1943), had access to large food surpluses raised outside Europe; the Nazis kept themselves and the German people relatively well fed until the second half of 1944, though at the expense of millions of civilians in occupied lands; Soviet civilians also went hungry in huge numbers, as already-scarce rations were diverted to the military.

- Meanwhile, Collingham notes that the Japanese military probably lost more soldiers to hunger than to combat (2011, 10), and by late in the war the home islands also faced massive hunger. Nationalist forces, especially those far from the wartime capital of Chongqing, generally received grossly inadequate rations and were forced to compensate by getting food from civilians, exacerbating already-severe hunger problems in many locations—above all, Henan.
- 12 Some of the river’s sediment was fine particles of fertile loess soil; some was essentially sand. Unfortunately, large, coarse particles were more likely to settle than fine ones, so Yellow River floods rarely enriched the soil the way one might expect.
- 13 In fact, the end of the Third Front initiative—which used up 40 percent of China’s capital construction budget between 1964 and 1980 in an attempt to build industrial capacity in areas that neither the United States nor the U.S.S.R. could bomb—might be an even better end date. For an account of the Third Front that emphasizes precisely the kinds of militarization foregrounded by Muscolino for Yellow River work, see Meyskens (2015).
- 14 On “sacrifice zones” and the Chinese military industrial complex, see Klinger (2015).
- 15 See, for example, Mertha (2008).
- 16 On the Yellow River in particular, see, for instance, Wang (2004).
- 17 See, for example, Jia, Ge, and Fang (2011).
- 18 For an overview of these issues, see Pomeranz (2015).
- 19 The contrast between the Yellow River (“traditional” authoritarian China) and “blue water” (cosmopolitanism and exploration) was central to the hugely popular television documentary miniseries *River Elegy*, which aired in 1988.

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