

CONCLUSION

IN THE SIX CENTURIES AT THE CORE OF THE STUDY, SOUTH CHINA underwent a radical environmental shift. This shift encompassed the widespread removal of tree cover, a depletion of woodland that was often both locally acute and regionally apparent. Yet rather than the *deforestation* of South China, this shift broadly resulted in the *creation* of a new type of forest across the region. While some woodland was permanently cleared as farmland or left as waste, the more common transformation was a shift from naturally seeded, mixed woodland to human-planted conifer plantations. This transformation was so widespread and so dependent on human behaviors that it can only be described as the creation of a new forest biome—a pattern of woody vegetation conditioned by the subtropical climate of South China, but overwhelmingly created, spread, and governed by human action.

The easiest aspect of this transition to trace is the development of a bureaucratic category to enumerate and administer economically productive *forests* and differentiate them from more diffusely conceptualized *woodland*. For centuries, laws and norms reinforced conditions of managed abundance, maintaining woodlands as open-access, tax-free lands whose bounties could be freely harvested according to simple regulations. These rules and attitudes all shifted in the eleventh century, when fears of wood shortages replaced assumptions of abundance. Soon, both state and private

stakeholders moved to prevent and even profit from scarcity. Gradually, the managerial category *forest* (*shan*) became the primary nexus between state and private claims, largely replacing the more diffuse concepts of the wilds (*shanze* or *shanye*). By 1200, the state surveyed and registered forests across the south. By 1400, law established forests as exclusive property. By 1600, accounting reforms eliminated most woodcutting corvée. Landownership replaced access rights; market-based oversight replaced forced labor; formal contracts and cadastres replaced informal rules of use.

To establish forests as both anthropogenic biomes and administrative sites—and to ensure that they persisted—silviculture had to meet two conditions. First, people had to clear the existing vegetation and replace it with planted trees. Second, they had to document their claims to the territory. It was only through the combination of these two transformations, one physical, one administrative, that diffuse, open *woodlands* became bounded, exclusive *forests*. In the absence of either of these conditions, the land generally reverted to the nonadministrative landscape and to different forms of use and patterns of vegetation as well. The spread of the administrative category *forest* is therefore a useful proxy for the environmental transformation that started in the mountains of Jiangnan and Zhejiang in the 1100s and expanded into Jiangxi and Fujian by the 1500s and into Hunan and parts of Guangdong, Guangxi, and Guizhou by the late 1700s.

Because surveys were themselves a part of the forest revolution, it is difficult, if not impossible, to say precisely what South China's woodlands looked like before this transition. But we can say with some confidence how these physical and administrative acts transformed them. Throughout the south, planters cleared old growth and spread blankets of fir, pine, and bamboo across the middle slopes of mountains. Locally, they planted stands of other commercially valuable woody plants like camphor, tung, and tea and nonwoody plants like hemp, ramie, and indigo. Zooming out, a broad swath of territory from the Yangzi River in the north to the West River in the south, from the South China Sea in the east to the Yun-Gui Plateau in the west, was defined by the interpenetration of two biomes: a planted grassland in the lower elevations and a planted woodland in the higher ones. This eco-administrative transformation of woodlands accompanied an eco-social transformation of woodland peoples. Much as taxpaying farmers had long dominated the lowlands, taxpaying foresters now dominated the uplands. Only the most inaccessible highlands and swamps remained as refugia for other communities, whether of woody plants or of humans.

LOST MODERNITIES

The development of forest oversight provides an important case study of Chinese administrative knowledge. When compared to the European and Northeast Asian experiences, China's forest administration appears both precocious and strange, a sort of "lost modernity," to borrow Alexander Woodside's turn of phrase. As Woodside argues, China's early bureaucratization left it with an advanced experience of both the benefits and the pitfalls of administrative formalism.¹ Similar patterns can be seen in the administration of landscapes as well. As early as 780, and with some maturity by the late twelfth century, the tariff system gave Chinese states a direct line of oversight over wood as a commodity. Cadastral forms treating forests as landed properties developed in 1149 and were essentially mature by the 1390s, while forest labor contracts reached a peak of complexity in the early 1600s. These all proved highly efficient ways of managing forests for revenue purposes, but at the cost of an increased bureaucratic distance between officials and the environment.

The positive side of the balance sheet was not trivial. So great was the productivity of the Yangzi River timber market—and the tariffs that drew upon it—that it underwrote a massive naval expansion without the need to substantially change the forest administration. While the *expense* of shipbuilding was a constant complaint during the East Asian naval race of the twelfth to fifteenth centuries, only occasionally did this translate into pressures on the woods themselves. Indirect, market-based management was so effective that it largely preempted the Chinese state from more direct impingements on its forests. There were still periods of intense state interest: Li Xian conducted major logging projects in the 1070s, as did the Prince of Hailing in the 1160s, Kublai Khan in the 1270s, and the Yongle emperor in the early 1400s. Cai Jing developed incentives for tree planting in the early 1100s, and Zhu Yuanzhang ordered extensive forest cultivation in the 1390s. South China's forest administration could have developed around these more direct interventions, much as forestry did in parts of Europe and Northeast Asia.

These "paths not taken" make for provocative counterfactuals that should force careful reflection. If not for the Jin invasions in the 1120s, it is quite possible that Cai Jing would be remembered as the father of state forestry—China's Colbert—instead of as the villain in a kung fu novel. If not for the Mongol conquests of the 1270s, South China might have anticipated Venice's

or Holland's development around merchant capital rather than being reintegrated into the command economies of a continental empire. If Yongle had not usurped the throne in 1402, Zhu Yuanzhang's quest for self-sufficient economies might have led to forestry focused on sustainable yield rather than to a forced labor assault on the gorges. These path dependencies should serve as a warning against both cultural and environmental determinism. The Yangzi River forest system was not the simple product of the regional environment, nor was it the necessary outcome of an abstract "Chinese" culture.

Nonetheless, the early emergence of bureaucracy in China repeatedly tipped key policies away from direct environmental interventions and toward general-purpose administrative forms. Instead of official ordinances or specialized wood courts, the most lasting changes in Chinese forest oversight were incidental to broad reforms in land surveys, tax accounting, and property law. Indeed, the most astonishing feature of Chinese imperial bureaucracies was their capaciousness to encompass a vast range of environments and a plethora of different institutions to manage them. Chinese bureaucrats were able to manage this portfolio of productive environments across major shifts in both high politics and local ecology. The transitions documented in the preceding chapters were remarkably continuous across bloody metamorphoses between regional and multiregional empires; a massive shift in woodland composition, from mixed natural growth to conifer plantations; and a complete transformation in woodland management, from informal logging restrictions to written contract and cadastre. In terms of state policy, these pivotal developments in politics, ecology, and regulation resulted in little more than the transfer of wood revenue from the state's fiscal oversight of labor (*corvée*) to its fiscal oversight of land (the land tax). In the meantime, the imperium repeatedly created and eliminated specialized institutions from the Xihe Logging Bureau to the Longjiang shipyards without causing major changes in the basic dynamics of the timber supply.

Yet for all their efficiencies, administrative forms are imperfect proxies for the things they are supposed to record—a hard-learned lesson that modern bureaucrats have only begun to rediscover. As James C. Scott argues in *Seeing Like a State*, schematic visions of the environment do violence to the complex interdependencies they presume to replace. Or to borrow a phrase from business management, "What gets measured gets done." In China's forest system, this inevitably meant that bureaucrats gave administrative

priority to measurable quantities like acreage, log dimensions, and prices, especially when compared to fuzzy “ecosystem services” like soil retention, climate stabilization, and wildlife habitat. These created growing discrepancies between the engrained lives of woodland communities and the abstracted formalisms of wood on paper. Woodlands that had functioned as complex webs of flora and fauna were replaced by forests that mostly served to produce timber and fuel.

Even within the human species, the prioritization of commodity production came at the expense of less fungible goods like fuel, famine foods, and hunting and grazing land. The woodland as eco-social safety net for the community gave way to private property that served only a small number of owners. As seen in contexts from South and Southeast Asia to the Americas, a second-order consequence of forest enclosure was to deprive thousands of woodland communities of their traditional roles and endowments.² But as this study shows, the enclosure of woods and deprivation of woodland communities was not strictly an outcome of European imperialism. These trends emerged in China long before Europeans colonized abroad, largely as forest owners adopted the forms of property rights used by lowland farmers and extended them into the hills. Title enforcement was the carrot tempting landlords into the system of cadastral oversight, while the monetization of taxes was the stick driving forest laborers into the contractual labor market.

Throughout this process, the very mechanisms that gave the state and forest owners oversight blinded them to community impoverishment, except to the extent that these declines impinged on timber production, tax payments, or contract fulfillment. Nonetheless, the simplification of complex environments inevitably led not only to the loss of fuzzy goods like “ecological services” but also to declines in the very wood yields measured by administrators. As shipyard supervisors and logging officials both discovered, the supply of timber depended on many factors that they did not measure. In a prescient foreshadowing of the modern world, sixteenth-century bureaucrats responded to declining wood yields by adding more boxes to their forms. But no number of formal categories could fully account for continental shifts in the supply and demand for timber, the influx of foreign silver, the erosion of hillside soils, or the displacement of woodland peoples to the frontiers and the contractual labor market. This precocious modernity anticipated the pitfalls of scientific forestry as it developed in Europe.

It is nonetheless misleading to treat Chinese forestry as an immature version of the European experience. For one thing, there was no single “European” forestry, with substantial differences even between the oft-conflated French and German schools.³ For another, the development of forestry, and of related disciplines like botany, cannot be separated from broader intellectual and political dynamics. In Europe, this included a plethora of competing states that allowed rival schools to flourish, compete, and learn from each other. By contrast, in China the civil service curriculum was dominant, and learning was highly conditioned by the forms of knowledge valued by the imperium. In this schema, forestry was treated as a minor branch of agriculture, and botany was left to the several miscellaneous traditions of textual commentary, local geography, and medical herbology. Finally, it mattered that forestry developed later in Europe, where it benefited from additional centuries of development in cameralism, survey techniques, and worldwide botanical exploration.⁴ There are indications that China may have been headed in a convergent direction in the eighteenth century, when some texts began to specify greater gradations between tree species, officials began to promote “best practices” in upland land use, and landowners began to note the environmental degradation wrought by slope clearance.⁵ Yet before these developments had a chance to mature into an independent trajectory of forestry, botany, or environmental science, as they began to do in Europe around that time, China entered a major period of crisis. As European empires expanded, the Chinese empire fell apart, and it was European forestry, not Chinese, that influenced most of the modern world.

THE MIGRANT CRISIS

Forest history also helps to understand the very crises that led to China’s decline in the nineteenth century, crises that had a lot to do with the movement of people in the upland south.⁶ Since Herold J. Wiens’s 1954 work *China’s March toward the Tropics*, historians have been preoccupied with the southward expansion of Chinese states at the expense of non-Han peoples. Much like Frederick Jackson Turner’s ideas about the American West, scholars of China have ascribed significant importance to the declining availability of land to absorb migrants, especially after 1800. In *The Retreat of the Elephants*, Mark Elvin reframes this civilizational narrative in environmental terms, with the advance of the Chinese state mirrored by the retreat, not only of non-Sinitic peoples, but of elephants and the woodlands that

sheltered them. In *The Great Divergence*, Kenneth Pomeranz lists the relative poverty of China's frontiers—as compared to European colonies in the Americas—as a key factor in the divergence between continued European development and Chinese stagnation. Some versions of the narrative take a more straightforward Malthusian line, where an absolute shortage of land relative to the growing population doomed Chinese patterns of development.⁷ Others give a more nuanced telling of events, showing that the “closure” of the frontier was a complex process that encompassed changes in both land use and land rights that precipitated environmental degradation and community impoverishment.⁸

At China's southern frontiers, upland settlement played a key role in the emergence of a new form of eco-social conflict. In particular, the numbers of Hakkas and “shack people” (*pengmin*) dependent on uplands multiplied just as South China began to run out of unclaimed hill land suitable for exploitation. Upland settlers brought a cascade of conflicts—between mountain landlords and the new class of tenants and squatters, between short-term cultivation and long-term depletion, between upland cash cropping and runoff downstream. The introduction of New World crops was another precipitating factor in the highland population expansion: the shack people often cleared land to cultivate maize and sweet potatoes for subsistence, although they also mined and planted annual commercial crops like indigo, tobacco, and tea.⁹

The migrants of the eighteenth and nineteenth centuries arrived in an upland environment that was already intensively exploited. By the time the shack people arrived, the most accessible and productive slopes in South China were already covered in forest plantations. This left them either to eke out a living in the few marginal niches ignored by timber and tea planters or to compete with forest owners for land. Because sweet potatoes and other annual crops leave the ground bare for long periods and consume soil nutrients at high rates, they led to further depletion of sensitive upland soils and the well-documented problems with erosion. Because Hakkas and shack people competed with timber farmers for land, their arrival led to well-documented social conflicts.

Fights over land rights, whether between highlanders and lowlanders or between tenants and landlords, were not new to the nineteenth century. Nonetheless, the growing conflicts of the mid- to late Qing both reflected and precipitated the emergence of new forms of social organization in the

highlands, tied to the Hakka diaspora in particular. As David Ownby shows, marginalized men created secret societies—including the “triads” of kung fu cinema—and became increasingly heterodox in the face of suppression. These societies spread throughout southeastern China along with the movement of landless men, many of whom were laborers in upland industries including timber planting and cash cropping.¹⁰ Later, the Communists brought another novel form of social organization to the highlands.¹¹ Mary S. Erbaugh and Sow-Theng Leong document the particular connection between Hakkas and the rebellions and revolutionary movements emerging from South China between 1850 and 1949: Taiping leader Hong Xiuquan was a Hakka, and so were major Communist revolutionaries like Zhu De and Deng Xiaoping.¹² This connection may be a bit too facile; despite the preponderance of Hakka revolutionaries, Stephen C. Averill shows that ethnic identity did not map directly onto political affiliation.¹³ Nonetheless, changes in land use and wood rights were a red thread connecting revolts and rebellions across South China for generations. The nineteenth and twentieth centuries merely brought more dispossessed people with new forms of organization to an environment increasingly crowded with rival claimants and depleted of resources.

My point here is not that the Taiping Rebellion and the Communist Revolution were fundamentally ecological conflicts. Ecology cannot be abstracted from human actions on the land and its biota, nor can human culture be extricated from its interactions with nonhuman life. Instead, my argument is that these uprisings were not the simple consequences of population pressure, ethnic conflict, or the displacements of capitalism. They were specifically conditioned by eight centuries of developments that pushed people into the hills and hill people into the markets, even as mountain land became less available as it was enclosed for fir plantations. This was not a case of a growing population and a static supply of land *in general*—it was a case of a growing hill population and a shrinking supply of woodland *in particular*. The ensuing conflicts had valences across lines of ethnicity, religious orthodoxy, and state-subject and landlord-tenant relations. But a fundamental condition of these conflicts was the end of upland cultivation as a tenable subsistence strategy, in the face of both long-term trends toward forest enclosure and an unprecedented short-term growth in the population attempting to live on the hillsides. Similar dynamics collapsed the balance between mountain forests and lowland farms in nineteenth-century Korea and

central Europe and conditioned a century of revolts from the French revolutions to the Tonghak Rebellion.¹⁴

PATHS OUT OF THE FOREST

Where does China's forest history go from here? When I started this project, I thought I was writing a preface to the intertwined social and environmental crises of nineteenth-century China. A decade later I can only speculate on the eco-social dynamics of those rebellions. Instead, I hope that this book presents a convincing articulation of the frameworks that conditioned state oversight in the forests and wood markets that preceded them. In this conclusion, I have used these frameworks to postulate about the trajectory of Chinese empire, both in comparison with European empires and through the crises that ended the imperial state. The first set of conjectures concerns the interplay between administration and expertise and ultimately speaks to the origins of environmental science and environmentalism. The second concerns the nineteenth-century crisis in the preceding systems of resource governance. In both cases, I have made an implicit comparison between China, which supposedly failed to produce a "modern" solution, and western Europe, which veered unsteadily toward modernity—whether this is construed as an intellectual, material, or technological advance. I hope that the foregoing chapters have demonstrated the contingencies in these developments. At various times China demonstrated what appeared to be convergent evolution toward forms of expertise, economy, and ideology that paralleled (or anticipated) developments in Europe. Yet its history remained distinct. For more than six centuries, China thrived while following a path that minimized state interventions in the forest. Thus far, this is a far longer history of success than the ongoing worldwide experiment with scientific forestry. This suggests that we must question the inevitability and superiority of the forest institutions we now take for granted.

By answering one set of questions about forests and empire, I have uncovered a slew of others, referenced obliquely in this text. I allude to wood rights and wood disputes in several chapters, especially as they relate to land use and labor migration. These are complex issues, especially in China, where wood rights were often tied to the further complications around graves and *fengshui*.¹⁵ Treatment of wood disputes also presents an avenue to introduce individuals to the story, including oft-silenced ones like women, children, and illiterate peasants. Wood fuels, such as firewood and charcoal,

deserve their own study, especially as they relate to the use of coal and to the energy transitions of the nineteenth and twentieth centuries. Changes in other uses of wood as well, whether for carpentry, furniture, or medicine, have their own rich history to explore, as do poetic and literary imaginations of woodlands. These are all important and complex questions for further research. I will now use these final few paragraphs to return to the larger story about ecological and institutional change.

China's landscape is neither entirely new nor entirely old. Between about 1000 and 1600, the woodlands of South China transitioned from one human-encompassing biome—a mixed forest modified by fire, swidden, hunting, and selective logging—toward another biome with even greater human influence, a landscape dominated by fir plantations. There were further continuities through the mid-eighteenth century. After that, it is clear that South China's woodlands underwent another radical shift between about 1750 and 1980, one largely but not entirely conditioned by the predations of warfare and radical social policy. Paradoxically, despite important new developments, the picture of landscape change since 1980 has been more of a return to pre-eighteenth-century form than a continuation of nineteenth- and twentieth-century trends. This suggests that China has not fully exited the age of forests that it entered in the Song.

More importantly, the continued importance of millennium-old forms of wood use suggests that we must reconsider the terms in which we understand forests and forestry. Forests are not mere containers or conditions for human action; while they change slowly, they do change. But nor are forests exclusively the products of human behavior; trees have their own complex behaviors and interactions. While planting, pruning, and logging remain the most important human behaviors promoting a biome dominated by young conifers, these trees produce their own constraints and potentials. Neither forests nor forestry could exist without one another. Even terms like *forest* and *timber* represent administrative attempts to both reflect and modify patterns of biotic growth. Given the depth and intensity with which human habitation has had an impact on the Chinese environment, biomes, even supposedly wild ones, are conditioned by human rules, norms, and behaviors. Given the continued material importance of the products of forestry and agriculture, even supposedly human institutions are closely intertwined with the biota from which they are built.

Like the ship of Theseus, institutions are constantly rebuilt as rotten planks are replaced with new ones, yet these structures show surprising

persistence well beyond the lifetime of any of their components. New timbers are grown, selected, and worked to fit into place. New workers are trained by the retirees they replace. Written records and unspoken norms specify the rules and sequences of operations. The long-term growth of the trees themselves provides its own form of continuity. In the face of malignant fiat and benign neglect, these patterns, the cumulative product of years of secondary growth, are strikingly hard to change. From one perspective, Chinese administrators tacitly recognized these constraints, imposing bureaucratic forms at an intermediate level of specificity and leaving individual communities to follow their own internal dynamics. From another perspective, administrators remained distant from the communities they governed because abstract authority was unable to shift deeply ingrained local patterns. Ultimately, the institutions that emerged were not inevitable, nor were they the simple products of high-level decisions; they were compromises, conditioned by the communities they governed and the repeated attempts of rulers to graft and prune these local forms into a coherent whole.