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Fir and Empire: The Transformation of Forests in Early Modern China

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For a long time, environmental historians have generally believed that Chinese forest history is a history of deforestation and removal of vegetation cover. Mark Elvin's *The Retreat of Elephants: An Environmental History of China* (2004) further solidified this academic cognition. Elvin claimed that the disappearance of forest cover forced elephants to retreat to a few refugia in southern China, hard against the borders with Burma and Laos. Elvin referred to the history of Chinese environmental development as 'the Great Deforestation'. In *Fir and Empire*, Miller argues that the dominant trend in southern China was 'the Great Afforestation'.

In the introduction, Miller briefly describes the history of planting of Chinese fir in early modern southern China and compares the different paths of forestry development between China and Europe. Miller argues that when European countries expanded their bureaucratic structures to oversee domestic forests, and colonised overseas to expand timber supplies, China chose to relax forest regulation and oversaw forests under the supervision of taxable land, labour and commerce.

In the first chapter, entitled 'The End of Abundance', Miller explores how the period from antiquity until the eighth century was a period of regulated abundance. Miller's research suggest that destructive behaviours such as logging, hunting and burning were strictly prohibited in the Qin Dynasty. Under the Song Dynasty, the increasing demand for wood led to the excessive exploitation of forest land by the people, and although officials of the Song took measures to restrict logging, this could not fundamentally solve the timber crisis. Private forest cultivation and timber commercialisation ultimately became the path taken to solve the timber crisis.

The second chapter, 'Boundaries, Taxes, and Property Rights', elaborates on how forests integrate into China's land supervision system. The Song Dynasty was the first to include forests within the scope of land jurisdiction, similar to the treatment of farmland. Song Dynasty officials conducted investigations and registrations on forest land, and levied taxes against these, granting land ownership to foresters in exchange for taxes. Due to their long-term land rights, foresters reacted by increasing wood prices and extending tree planning in southern China, with China fir and horsetail pine extending from the Yangzi River to the southern slopes of the Nanling Mountains and from the seacoast to the Yun-Gui Plateau.

The third chapter, entitled 'Hunting Households and Sojourner Families', introduces how Chinese officials managed forest activities such as hunting and logging. In the Song Dynasty, officials regulated forests by imposing forestry

taxes on loggers and hunters. The year 1580 was a turning point in China's forest regulation. The Ming Dynasty Prime Minister, Zhang Juzheng, announced economic reforms, replacing direct levies of goods and labour taxes with a 'silver budget'. Although this reform was essentially an accounting trick, it meant that the state's intervention in land and labour was reduced.

In the fourth chapter, 'Deeds, Shares, and Pettifoggers', Miller carefully examines how forest owners and workers use contracts to divide the risks and rewards of timber planting. Unlike early Europe, Korea and Japan, China had almost no specialised timber laws, leaving forest owners, tenants and labourers to work out their own contracts. In the contract, shareholding was adopted to divide the interests of forests and land, and emerged as a solution to the problem of dividing ownership of large, spatially irregular plots. When the contracts were violated, forest owners and workers chose to resolve the disputes through litigation, with private litigation masters (similar to modern lawyers) emerging in China in the 11th century.

In chapter 5, 'Woods and Water, Part I: Tariff Timber', Miller reveals in detail how the state imposes a small number of tariffs on commercial transportation to obtain a sustained supply of wood. The tariff system was established from the Song Dynasty and has continued in China to this day. The Song Dynasty set up customs stations to tax especially bamboo and timber rafts, and these taxes were subsequently used to purchase wood from forest owners for shipbuilding and construction. The prerequisite for imposing tariffs on the timber industry was the presence of vast, abundant water sources and densely forested inland areas. Without this natural advantage, forestry owners would not be able to pay tariffs and provide timber to the government. Miller claimed that market-based oversight, not territorial control, was the principal state intervention into the forest landscape.

The sixth chapter is titled 'Woods and Water, Part II: Naval Timber'. Zhu Yuanzhang relied on military forces at sea to defeat the Mongols and establish the Ming Dynasty. Zhu vigorously developed maritime military forces. At its peak, the Ming navy had 1000 ships and 100,000 soldiers. After the death of Zhu, Yongle became the new emperor. Yongle transferred the shipbuilding industry from Nanjing to Beijing. Flourishing wholesale plantations of commercial species, such as fir and pine, directly powered the development of the Ming navy. The greatest achievement of the navy building, the book reports, was the Zheng He's armada. Zheng He's armada conducted six expeditions under Yongle (p. 184), reaching East Asia, East Africa, the Arabian Peninsula and the Americas. Zheng's navigation activities played an important role in promoting cultural exchange between the East and the West.

Chapter 7 is entitled 'Beijing Palaces and the Ends of Empire'. Unlike in Europe, where monumental buildings were built of stone, China's imperial architecture was almost exclusively dependent on a supply of exceptionally large trees. Emperor Yongle ordered the loggers to cut down the last piece of

REVIEWS

primitive forest in the Yangtze River basin in order to build a grand Beijing palace. His successor, Emperor Xuanzong (1424–1435), realised that the ecological environment was facing a major crisis and ordered the termination of all logging projects. Emperor Jiajing (1522–1566) once again ordered the resumption of logging work in order to repair the palace, which had been destroyed by fire. Due to the depletion of timber in the Yangtze River Basin, the imperial logging team turned their attention to the southwestern region of China.

In the conclusion, Miller believes that contemporary China still draws inspiration from the forest regulatory system of the Song Dynasty. From the 11th century to the 17th century Chinese woodland composition experienced a massive shift from mixed natural growth to conifer plantations. At the same time, woodland management made a complete transformation from informal logging restrictions to written contract and cadastre. Private ownership of forests continued in China until the 1950s. Mao Zedong's land revolution (1950–1953) declared the end of private ownership of land. In 1978, Deng Xiaoping advocated for the system of contract-land, and China once again returned to land privatisation. The above signs indicate that China has not exited the age of forests that it entered in the Song (p. 228).

Because of the low level of state intervention, very few official documents exist to explain how forestry and timber markets operated in early modern China. Miller uses previously neglected nongovernmental sources (such as forest deeds, contracts and cadastres) to bring life to this insufficiently explored but undeniably transformative timber age. In my view, Miller has made four pioneering contributions to Chinese forest history.

Firstly, Miller suggested that the dominant trend of forest change in early modern southern China was 'the Great Afforestation' rather than 'the Great Deforestation'. In Elvin's investigation, 'deforestation' was the dominant trend of environmental change in early modern China. Elvin focused on the northern regions (at that time, the Jurchen tribe ruled northern China). The rulers of the Jin Dynasty (1115–1234) extensively deforested in order to build palaces and cities. However, the south experienced a completely different trajectory from the north. The surrounding areas of Lin'an, the capital of the Southern Song (1127–1279), were rich in soil and had convenient water transportation, making them particularly suitable for planting trees. During the Southern Song, large areas of cultivated woodlands, plantations, orchards and tree farms sprouted, spread, and were sustained across the empire, and in particular, across South China. Although China's ancient forests have been disappearing irreversibly for a long time, since the Song, generations of Chinese people have made unremitting efforts to curb or slow down this trend.

Secondly, Miller found that forestry in early modern China embarked on a market-oriented path different from that of modern European countries. Since modern times, European countries solved the timber crisis by establishing a

modern forest system led by national management. The important feature of modern scientific forestry was calculation of the sustainable yield of commercial timber through precise forestry surveys and measurements, and chaotic native forests were transformed into new single forests through manual intervention. Compared to the European forest management system, the rulers of the Southern Song Dynasty established a 'weak regulatory' system. The 'weak' was reflected in the state's relatively small control over mountain and forest property rights, and the lack of a centralised and specialised forestry service system. The 'regulation' was reflected in the indirect management of mountains and forests through taxation, market and law. Although this *laissez faire* management model is highly efficient, it also hinders the development of specialised environmental knowledge. For example, the principal timber tree in southern China was named by (and for) British botanists, not Chinese ones.

Thirdly, Miller believes that the forest regulatory model in early modern China had a significant impact on the development of forestry in East Asia, and even the wider world. For example, Korea introduced and elaborated a pine planting system in the 15th century; Japan compiled a systematic forest cadastre in the 17th century; and Nuremberg planted fir and pine trees in the 14th century. Li Chunnian, an economist from the Southern Song, completed China's first land registers in 1149, and since the 12th century China extensively planted fir and pine trees. In 1600, the planting area of fir and pine trees was approximately 20 million acres. Although there is no direct evidence to suggest that China provided guidance on the establishment of forest regulatory models in these other countries, they all adopted the Chinese model in practice.

Fourthly, Miller discovers that the main reason for the surge in timber consumption in early modern China was shipbuilding. Environmental historians generally believe that the sharp increase in population was the main reason for the increased consumption for wood in early modern China. According to historical records, the population of the Tang Dynasty was approximately 70 million, while the population of the Song Dynasty exceeded 120 million. The sharp increase in population led to an increase in demand for wood which, in turn, led to the removal of large areas of tree vegetation and the decline of forest land. But Miller found that shipbuilding was the main reason for the increase in wood consumption. Maritime military strength played a decisive role in the wars of the Song, Jin, Yuan and Ming. The intense sea warfare spurred large-scale construction of specialised warships and the development of an independent naval administration. For example, the ships in the Ming ranged from 385 to 440 feet long. By comparison, Christopher Columbus's flagship was only 86 feet long. From 1403 to 1424, there were a total of 2868 Ming's oceangoing ships. (p. 184) Shipbuilding led to the consumption of a large amount of timber, while war also led to the decline of forest management systems. Although China's forestry originated at least two hundred years earlier

REVIEWS

than European forestry, it is European forestry, not Chinese, that influenced most of the modern world (p. 223)

In *Fir and Empire*, Miller convincingly demonstrates that China's forest history is far more complicated than a unidirectional, homogeneous, process of deforestation by human devastation. Miller's academic investigation is in-depth, comprehensive and innovative, making it a must-read book for scholars and lay readers interested in Chinese forest history.

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