**Chapter 2. Economic constructs**

**Tea and utensils**

Raw tea to consumable tea

**Tea plantations in today’s Fujian**

Huizong and other authors of the *Daguan Treatise* favoured tea from the plantations at Jianxi, Beiyuan, and other places in the Fujian area. Their favourite tea was called “Jian’an White Tea”. These tea lovers subscribed to a botanical theory for cultivating tea bushes in which the *yīn* (negative energy)and *yang* (positive energy) should be balanced to produce the best tea.[[1]](#footnote-2) They argued that tea bushes growing on cliffs should be exposed to the sun as the *yīn* and cold energy of the cliff rocks would leave the plants undernourished, rendering the tea less flavourful. Exposure to the sun, conversely, would strengthen the growth and enhance the taste of the tea. In contrast, tea bushes growing in a plantation should get more shade as the soil’s *yang* and *fu* energy would cause the bushes to grow too vigorously and render the flavour of the tea too strong.

We do not currently know whether Huizong and his subordinates’ theoretical conjectures reflected the actual landscape of tea plantations at the time, but we can use the spatial organisation of modern-day tea plantations as a reference. A discovery of the archaeological remains of a Tang-Song tea plantation, allowing biologists and geologists to conduct pollen analysis and examine ecological and climatic conditions, would be a windfall for students of tea history. However, in the absence of a lucky finding of this kind, we cannot reliably say how these ancient tea-growers cultivated their precious crop. While we lack direct evidence attesting to how Northern Song farmers cultivated tea bushes, the issues they faced were unlikely to be all that different from those faced by modern-day tea farmers. Ethnographic study of how modern-day farmers cultivate the tea bushes in the Fujian area can offer insights into how Northern Song farmers may have planned their tea plantations.

The landscape of the Fujian area is very diverse (see fig. 2.1). The mountainous northwest is dominated by Mount Wuyi (indicated roughly by the red mark in fig. 2.1). Beyond the mountains are Shangrao, Fuzhou, Nanchang, and the famous porcelain city of Jingdezhen in the Jiangxi region. To the northeast of Fujian is the Zhejiang region, where Hangzhou is easily reachable. To the south are the famous port city of Quanzhou and other harbours from where ships set sail for Southeast Asia and more distant regions in search of exotic trade goods during the Northern Song.[[2]](#footnote-3) Tea grew in almost every region in southern China. Some regions were more famous than others for their tea plantations. The Northern Song elites favoured tea from the Jian’an area (today’s Jian’ou and Nanping counties) near Mount Wuyi. We do not know precisely where the Northern Song tea plantations in Jian’an were. Despite this, many plantations claim ancient pedigrees to attract tourists. We will focus on the tea plantations in the Neiguidong and Daoshuikeng canyons as examples for our ethnographic study.

Fig. 2.2a and fig. 2.2b show a tea plantation in the rocky Neiguidong Canyon. On one side of the Neiguidong canyon is another canyon called Daoshuikeng (fig. 2.3a and fig. 2.3b). The two canyons are separated by a long and narrow rock formation about 90–150 metres high if measured from the bottom of the canyon. There are numerous similar canyons in the Mount Wuyi area. I took pictures and conducted a long-range laser 3D-scan of the two canyons. Fig. 2.3a is a captured image from our freely rotatable 3D-scanned model. Tea bushes in Neiguidong Canyon are mostly wild species (fig. 2.2) scattered all over the canyon. In contrast, bushes in Daoshuikeng Canyon are highly domesticated and neatly planted in rows along the slope (fig. 2.3). The many rows separated by black stripes in the aerial view of Daoshuikeng Canyon in fig. 2.3a show this pattern of tidy cultivation.

The landscape and climate of the canyons offer ideal conditions for the growth of tea bushes. First of all, the altitude of the two tea plantations is about 230–280 metres, which is relatively low in the Mount Wuyi area. The humidity is very high as moisture-laden winds from the sea blow through the canyons. The warm wind encounters the cold air in the mountains, leading to mist and moderate rainfall. When we first arrived there in the winter of 2018, the tea plantations were shrouded in clouds and fog. The temperature was about 5–15°C when we were in the canyon. Summer temperatures are naturally higher. The canyons trap the moisture and fog as their 90–150 metre-high rock formations create narrow gorges. The particular landscape and weather conditions of the canyons protect the tea bushes from direct sunlight. Tea bushes thrive in shady places that are usually cloudy and moist without excessive sunlight.[[3]](#footnote-4)

Originally, the rocky surface of the ground was not fertile for any vegetation. However, after millions of years of weathering and erosion and the accumulation of decomposed vegetation, there is a dark and fertile layer of soil built on the rocky surface.[[4]](#footnote-5) Wild tea bushes can grow in this thin layer, but their roots do not reach deep into the ground. Consequently, these bushes are barely taller than the height of an adult man and much shorter than the tea trees grown in the Yunnan area. Local tea farmers told us this is why the tea they cultivate has a mineral quality to its flavour (rocky bone and flowery fragrance).[[5]](#footnote-6) The moisture, rain, fertile soil, shade, and moderate sunlight constitute an ideal micro-ecological system for tea cultivation. Bacteria and fungi of many kinds can proliferate under the shade of the bushes, leading to complex layers of flavour developing in the tea.[[6]](#footnote-7)

Wild bushes grow individually and are spaced out. The farmers do not usually trim them. Nowadays, their growth is affected by the domesticated bushes grown nearby. Domesticated bushes are planted in neat rows, which makes them easier to trim. Fertilisers are both artificial and natural. Local farmers informed us that both human and animal excrements were brought to the canyons before the days of chemical fertilisers.[[7]](#footnote-8) As the canyons are far from densely settled areas and high in the mountains, large amounts of human and animal manure were unlikely to have been transported to them. Natural fertilisers include leaves that decompose and turn into humus by soil microorganisms. Local farmers have transformed the natural creeks and slopes into terraces with drainage systems. Tea bushes thrive in moist conditions, but their roots do not tolerate water-sodden soil. For this reason, terraced slopes and drainage are used to help get rid of excessive water (fig. 2.3).

**Tea plantations in the Northern Song**

Apart from access to chemical fertilisers and pesticides, Northern Song farmers were probably armed with the same knowledge and techniques for cultivating tea in their plantations available to modern tea farmers. They likely utilized the landscape and climate to their best advantage, using available techniques to optimise the health of their tea bushes, including managing humidity, moisture, rainfall, shade and sunlight, microorganisms, natural fertilisers, terraced slopes, and drainage. Like today’s tea plantations, those in the Northern Song were primarily situated south of the Yangtze River. In addition to the tea harvested from Fujian, there were multiple tea varieties, such as the *caocha* from the Zhejiang areas, *Rizhu* tea from Shaoxing, *Hongzhou Shuangjing* tea from Jiangxi, and *Mengding* tea from Sichuan Yazhou.[[8]](#footnote-9) Sichuan tea was historically prized and strategically important,[[9]](#footnote-10) but according to authors of the *Song History*, the quantities produced in Sichuan could not be compared to that of Fujian and its neighbouring areas.[[10]](#footnote-11) We do not know the exact difference in the volume of tea produced in every region, but harvest yields must have been determined by natural conditions and the cultivation techniques used by tea farmers. Wild tea plants in the Sichuan and Yunnan areas could grow to the size of trees, while in the Fujian area, they remained bushes. Regional climates, geological conditions, and micro-organic systems differed from place to place.

Moreover, cultivating tea plants on terraced slopes also affected how farmers pruned the plants and picked the buds and leaves, all leading to significant differences in production yields. According to the historian Qi Xia’s reconstruction, one acre of tea plants could yield about 120 *catties*[[11]](#footnote-12) (720 kgs) of tea.[[12]](#footnote-13) However, the reality is far more complicated, as farmers would need to decide the number of harvests per year. Excessive harvesting accelerates the maturing of the tea buds. This is undesirable as only young leaves are appropriate for tea. Rare tea species probably yielded harvests in the order of a few *taels[[13]](#footnote-14)* a year per bush, while ordinary ones yielded more. These reconstructions of tea yields are only indications of what might have been during the Northern Song.

**Cultivating, picking, and processing tea**

Picking tea buds and leaves

The elites writing about tea in the Northern Song were unlikely to have had any direct personal experience picking the crop. Harvesting tea leaves is backbreaking and onerous work typically conducted by rural peasants, and the tea plantations were far away from the Northern Song capital of Kaifeng in Henan. Nevertheless, they felt comfortable describing the ideal conditions for cultivating and picking tea in their treatises. The authors of the *Daguan Treatise* may have consulted contemporary tea texts and interviewed local tea farmers. The appropriate season, timing, and method of picking tea buds are briefly described (or constructed) in the *Daguan Treatise*. The treatise suggests that the best season to pick tea buds was considered the time around the day of “the Awakening of Insects” (*Jingzhe*), the third of the twenty-four solar terms of the traditional Chinese calendar, corresponding to around early March.

Similarly, the “Treatises on Food and Commodities” (“*Shihuozhi*”) in *Song History* considers March the best time to pick tea buds and the second best time before April.[[14]](#footnote-16) The *Daguan Treatise* authors suggested that picking the buds was best done by using the fingernails to sever the buds from the stems rather than rolling the buds between the fingers.[[15]](#footnote-17) They also emphasized that tea buds that appeared like “bird tongues” or “grains” (“*queshe guli*”) were the best; bud and leaf pairs that resembled a spear and a flag (“*yiqiang yiqi*”) were the second best; one bud with two leaves (“*yiqiang erqi*”) was third best, and all other configurations were of lower quality.[[16]](#footnote-18) These detailed records suggest that the knowledge about the picking season and selection criteria probably came from experienced local peasants and that this technical know-how was widely shared among the Kaifeng elites.

Processing and preserving tea

None of the tea texts comprehensively covers the process of turning tea buds into tea cakes. They merely list the ideal standard processes of steaming, compressing, baking, and drying. Huang Ru’s *Essential Records of Tasting Tea* (*Pincha yaolu*), published approximately thirty years before the *Daguan Treatise*, mentions some of these manufacturing processes. The *Daguan Treatise* authors might very well have consulted this source. Huang Ru’s approach was, however, slightly different from that prescribed by the *Daguan Treatise*. He lists some of the results of unsuccessful tea processing. For example, he discusses the results of over-steaming and under-steaming the tea.[[17]](#footnote-19) The *Daguan Treatise* authors, in contrast, focus primarily on establishing criteria as to what constituted the proper treatment of the tea buds and of processed cakes of tea that they suggested tea producers follow. In his tea text, compiled approximately eighty years after the *Daguan Treatise*, Zhao Ruli elaborates on some of these manufacturing processes in detail. Zhao Ruli added squeezing and grinding tea to the process of producing finished dried tea cakes.[[18]](#footnote-20) Although we do not know how closely the tea-making methods in Zhao’s time resembled those of Huizong’s time, it is clear that their preference was for tea that was processed using refined techniques before it was sold to tea drinkers.

Due to the lack of textual records about techniques for processing and preserving tea, we will rely on ethnographic studies and the treatment of herbal medicine from the same period. The *Daguan Treatise* mentions steaming, compressing, and baking.[[19]](#footnote-21) These methods aim to squeeze water from the tea buds and leaves while preserving, or even enhancing, the taste and fragrance of the tea. Where did they learn how to process raw tea? When a large amount of raw tea was harvested, it needed to be dried and preserved quickly and correctly so that it could be transported to distant regions, for example, from Fujian to Henan. Otherwise, the tea would rot. The necessary techniques may have been passed down to the Northern Song tea farmers from the ancient Chinese. But how did the ancients know about this?

The processing and preservation of tea were related to the drying and processing techniques for herbal medicine. We mentioned in our discussion of the drying and processingtechniques of medical herbs in Chapter 1 that the *Fifty-two Prescriptions* in the Western Han period, *Lei’s Treatise* in the fifth century, and the various medical texts compiled before and during the Northern Song reveal that medicinal practitioners and scholars possessed sophisticated knowledge for preserving herbal medicines. The aim of these methods was to extract water from the medicinal herbs while retaining and reinforcing their medicinal functions (taste and fragrance). This is not at all unlike the aim of processing tea leaves. Today, we know that extracting water from food helps kill bacteria and other microorganisms and that heating denatures the enzymes that are a major cause of food rotting.[[20]](#footnote-22) Northern Song tea farmers would not have known about bacteria and enzymes, but they would certainly have known from inherited wisdom and experience that steaming, compressing, and baking helped preserve tea and other herbs for longer.

In the following sections, we compare the techniques used to process tea and herbal medicine to explore the relationship between the two processes despite the fact that no Northern Song tea writer explicitly mentions the relationship between tea and herbal medicine. As mentioned above, Lei Xiao and his fifth-century contemporaries developed numerous drying and processing methods and laid the theoretical and practical foundations for the technical tradition of drying and processing. Tea makers consulted and incorporated these methods into their tea-making process, just as the *Daguan Treatise* authors borrowed the descriptions of the drying and processingprocesses from the medical texts and constructed their own language in describing tea:

1. the “Location,” “Season,” “Picking and Selecting,” and “Identification” chapters of the *Daguan Treatise* could be based on the medicinal reasons for selecting the best herbs picked in certain seasons and regions. Lei Xiao and others used barbary wolfberry fruit [*gouji* (Ch.), *Lycii fructus* (LPN)] as an example to illustrate the rationale behind the method. They suggested that in the spring, one should eat the leaves of the *gouji*; in the summer, the seeds; and in the autumn and winter, the roots and seeds.[[21]](#footnote-23) They also proposed that one use pepper seeds [*Hujiao* (Ch.), *Piperis fructus* (LPN)] from the so-called “barbarian regions” and the shells of *Hanjiao* from within China as medicine.[[22]](#footnote-24) Medicinal herbalists believed that plants from different regions had different degrees of medicinal power, different parts of the herbs performed different functions, and the same herb functioned differently in certain seasons.[[23]](#footnote-25) Tea-makers and drinkers shared the same beliefs and explored them in chapters in tea texts modelled on medicinal texts.

Some parts of the herbs might be useless or even poisonous. Medicinal practitioners had to distinguish them and select the appropriate parts before processing. For example, Lei Xiao and others suggested discarding the side branches and retaining only the leaves of the Chinese arborvitae twig and leaf [*baiye* (Ch.), *Platycladi cacumen* (LPN)].[[24]](#footnote-26) This process is very similar to choosing only the tea buds and leaves of the tea plant. Common monkshood daughter root [*fuzi* (Ch.), *Aconiti lateralis radix praeparata* (LPN)] was to be used with great care because the plant it is extracted from contains highly poisonous and lethal aconitine.[[25]](#footnote-27) Lei and others cautioned that one has to process these herbs in order to reduce the aconitine content. Although raw tea is commonly considered non-toxic, inappropriate processing may still damage its taste and fragrance and cause harmful elements to be retained. Tea makers likely considered the methods of processing medicinal herbs when processing tea leaves.

The “Steaming and Compressing”, “Processing and Producing”, “Storage and Baking”, and “Baking at External Workshops” chapters of the *Daguan Treatise* contain several processing techniques, also mentioned in the *Lei’s Treatise*, which seemed to have passed down to the Northern Song. These techniques include trimming, grinding, steaming, soaking, slowing diluting after soaking, drying in the shade or the sun, baking by blowing hot air over ingredients in a container to avoid direct contact between the fire and the herbs, roasting by laying the ingredients in a pan with the fire directly underneath, stir-frying by flipping the ingredients, frying with a more delicate motion not flipping the ingredients too much, and cooking with water.[[26]](#footnote-28) Only those techniques of treating herbal medicine that are similar to the treatment of tea are discussed here, while Lei Xiao and others also included methods of processing mineral and animal ingredients.

The drying and processing methods help strengthen the efficacy of the medicine, while the appropriate processing of the tea is also suitable for tea and the tea-tipping practice. In the “Processing and Producing” and “Identification” chapters, the *Daguan Treatise* authors specifically mentioned the negative results of inappropriate processing, such as unrefined filtering, overheating, and processing that goes on for more than one day and night.[[27]](#footnote-29) Proper filtering, timing, processing duration, and heat control are essential to the drying and processing of both the medicine and tea.

The cold treatments of trimming and grinding are simply intended to remove the unnecessary and ineffective parts of the herbs and tea, while the hot treatments leading to reactions between the herbs and other ingredients are worthy of further investigation. The steaming, baking, drying, and roasting methods remove the water in the drying and processing of raw materials, but there are different ways of heating. One could simply heat the raw materials by themselves, heat them with alcohol or other medicinal decoctions, or cook them with water, salt, or honey.[[28]](#footnote-30) Heating with alcohol might lead to chemical reactions, but Lei and others believed it also helped preserve the medicine and strengthen its medicinal power. We now know alcohol, honey, and salt also better preserve the medicine because high concentrations of alcohol, salt, or sugar extract the water molecules from the bodies of the microorganisms, inactivating or killing them. Heating also stops the action of enzymes.

For instance, Lei and others suggested that to treat *baiye*, one should soak it in liquified sticky rice with sugar for seven days. After taking out the *baiye* and diluting it, the herb needs to be steamed with alcohol, then soaked in juice squeezed from Siberian Solomon’s seal rhizome [*huangjing* (Ch.), *Polygonati rhizome* (LPN)], and subsequently baked until it dries. Soaking and baking are repeated several times until the *huangjing* juice is dried out.[[29]](#footnote-31) Peony roots (*shaoyao*) need to be dried in the sun before their rough skins can be removed with a bamboo knife and trimmed. The roots are then placed in water with honey, steamed for four hours, and dried out under the sun before use.[[30]](#footnote-32) Redroot gromwell [*zicao*( Ch.), *Arnebiae radix* (LPN)] has to be steamed with water and wax until the water is extruded. Its head and fine roots are removed and trimmed.[[31]](#footnote-33) Lei and others did not specify what wax they used, but they indicated clearly that three taels of wax should be melted with water in a large vessel. The melted wax was to be heated with the *zicao* to be processed.[[32]](#footnote-34) In this way, the *zicao* would be coated with wax as the water came out. While medicine treated with a high concentration of alcohol and honey keeps water and bacteria away, medicine coated with wax would be preserved well because wax is insoluble in room-temperature water and does not melt in natural conditions under 40°C. Namely, when the *zicao* is stored at room temperature, the wax coating will prevent the *zicao* from being affected by humidity. No water molecules permeating the wax coating means no microorganisms will grow inside. The medicine can then be preserved for a long time.

Historical records mention a tea type called wax-surfaced tea cakes (*lamiancha*).[[33]](#footnote-35) Was the *lamiancha* a type of tea coated with wax like the *zicao* mentioned in *Lei’s Treatise*?[[34]](#footnote-36) This is likely because tea was processed in ways similar to the treatise. The addition of camphor and other aromatic substances to the tea, criticised by Cai Xiang, the *Daguan Treatise* authors, and other scholar-artists, but which remained popular among the general public, was probably also an inheritance from the medicinal tradition since it was believed that the addition of camphor not only strengthened the fragrance of the tea but also helped preserve it. The intense fragrance of camphor would repel insects that could infest the tea leaves, and this processed aromatic substance made of dehydrated fragrant timber would also absorb moisture, protecting the tea.

In the Northern Song tea texts, especially in the *Daguan Treatise*, the discussions of processing and preservation techniques for tea reveal the consequences of over-treating or under-treating tea. These discussions parallel those of inappropriate treatments of medicine. Inappropriate treatments would change the taste, fragrance, and functions of the tea and medicine. Many drying and processingmethods cited by Tang Shenwei, Chen Shiwen, and their colleagues were authorized by Northern Song governments to ensure the quality of the production and preservation of medicine.[[35]](#footnote-37) Such government-authorized methods were undoubtedly a significant source of improved tea-preservation knowledge among tea farmers.

These beliefs and knowledge laid the foundation for drying, processing, and preserving medicine and tea in the subsequent generations. The half-fermented *wulongcha* and fully fermented red tea in today’s Fujian were inventions from the Ming and Qing dynasties,[[36]](#footnote-38) but their technical origin, the making of green tea (unfermented tea), harked back to the Tang-Song or even earlier periods. Today’s techniques, such as withering (*weidiao* – losing water), killing-green (*shaqing* – heating to destroy enzymes), rolling (*rounian*), and baking share the same principles, theories, concerns, and practices with ancient tea-making and medicine drying and processing methods.

Manpower

We can imagine that a considerable investment in manpower was needed to pick and process the raw tea in a time without modern machinery. As recorded in the “Treatises on Food and Commodities” in the *Compendium of Song Dynasty Government Documents* (*Songhuiyao jigao*), tea plantations owned by the government are known to have had labour forces of over one thousand men.[[37]](#footnote-39) In the 1077 dispute in Sichuan Chengdu Pengzhou, a document submitted to the court states that the salary for one labourer per day was sixty *wen* (or *qian*/cash) plus a daily ration of a bag of tea.[[38]](#footnote-40) This document also mentions a part-time labour force hired to trim bushes, remove weeds in the winter and spring, and pick and produce tea from spring to summer.[[39]](#footnote-41) We can postulate that owners of tea plantations would hire a long-term force consisting of knowledgeable and skilled workers to help maintain the normal operation of the plantations, while in the busy seasons, part-time labourers, probably consisting of unskilled peasants, were hired to do the heavy-lifting and arduous tasks associated with running a tea plantation.[[40]](#footnote-42) The skilled workers might have supervised this force of day labourers and ensured the quality of tea they picked and processed. This is how today’s large-scale plantations in Fujian work. The plantation owners probably inherited the plantations, skills, and knowledge from their parents. As tea masters themselves, they would maintain a long-term force by keeping several skilled workers and continually training new blood to serve as supervisors. Onerous and repetitive work, such as picking tea in the mountains and processing the tea in factories, would be assigned to seasonal labourers from Shangrao and Fuzhou areas in Jiangxi.[[41]](#footnote-43) Even today, Shangrao and Fuzhou are some of the poorest mountainous regions in Jiangxi. Jiangxi is, as a whole, far less prosperous than the rich and well-developed regions of Zhejiang and Fujian. Today, seasonal labourers are bussed into the Mount Wuyi plantations by the plantation owners. Both men and women are hired. Women are often deemed more careful workers and assigned the more meticulous tasks. The wages they receive during the picking season contribute a significant portion to their family’s annual income. In this way, the tea farmers in Fujian today and in the past ensure the quantity and quality of tea produced annually. Considering that the tea plantations were located historically in areas remote from metropolitan areas, the part-time employment system must have held sway throughout history.

Ownership of tea plantations

The owners of tea plantations in the Northern Song were socially diverse. There were plantations owned by the Emperor, the state, the local governments, Buddhist monasteries, and private subjects. Plantations owned by Buddhist monasteries had existed since the Tang.[[42]](#footnote-44) Those owned by the Emperor and the government in Fujian were located in Jian’an.[[43]](#footnote-45) Produce from these plantations would be paid to the royal court as tribute. When Ding Wei and Cai Xiang served as fiscal commissioners of Fujian, they were in charge of supplying tribute tea to the royal court. The annual harvest of prestigious Large Dragon-phoenix Tea was only two *jin*. Each *jin* of this precious tea could be made into only eight tea cakes. When Cai Xiang held office, he made ten jin of new tea in one year. Each *jin* was turned into ten Small Dragon Tea Cakes offered to Taizong and Renzong.[[44]](#footnote-46) This rare and highly prized tea came from bushes that could only be cultivated in government-owned plantations. Privately owned plantations could be enormous, but the standard of their tea was considered inferior to those of the government-owned ones. Huang Tingjian’s family-owned tea plantations in Jiangxi Hongzhou, which was famous for the Hongzhou Shuangjing tea brand, could provide a stable supply to Huang’s tea gift repository.[[45]](#footnote-47) Tea entrepreneurs existed in this highly profitable business and industry sector, but the government was also concerned about ownership issues.

Tea policies

**The eternal problem of supply and demand**

Policies regarding the tea industry were a source of problems for the Northern Song government.[[46]](#footnote-48) Tensions triggered by the eternal push and pull of supply and demand existed at the central and local government levels, among the merchants and farmers, and with the peasants in the tea industry. Debates raged unabated throughout the Northern Song period over how best to manage the tea trade in terms not unfamiliar to us – planned or liberal economies, “the invisible hand,” monopoly, state-run, and privatized ownership were all considered.[[47]](#footnote-49) Numerous scholar-officials were embroiled in these debates and utilized their experience and knowledge to offer blueprints for reforming the tea trade.

Problems facing the Northern Song dynasty founders and successors were plentiful. The most pressing was how to provision their forces guarding the northern frontier.[[48]](#footnote-50) It was a problem that the government could not handle by itself, and the private sector was brought in to help maintain the strategic supplies. The central government decision-makers were provided with piecemeal intelligence. Soldiers in the north needed food and horses, but these were in short supply in the regions where they were stationed. Southerners were often stuck with a surplus of tea that they could not consume. Northerners and foreigners loved tea, but it grew only in southern China. When it was sold to the north, the profits could be over three hundred percent. Transportation was expensive. Nomads had developed a taste for tea and had good horses, while those in Chinese-speaking regions were inferior. Putting the various pieces of information together, the central government devised ways to balance the supply and demand of several commodities and even to create demand where it previously did not exist.

To ensure adequate food and material supplies to the northern frontlines, the Northern Song central government decided to solicit the help of the merchants. Transportation to the north was exorbitant enough to discourage people from entering this business, so the political elites decided to use the high profit from the trade of rice, salt, and tea to mobilise the merchants.[[49]](#footnote-51) The central government monopolized the tea supply and gave merchants willing to transport food and materials to the northern frontlines privileged access to tea markets.

At the beginning of the dynasty, state-run tea trade centres were established in the capital, Jian’an, and other regions.[[50]](#footnote-52) The central government ordered the local government to collect processed tea and store it at trade centres. Merchants needed to place deposits with the capital trade centre and obtain tea from local trade centres to sell to other regions. The local government ordered private tea farmers to pay deposits to tea plantations controlled by the state (*shanchang*), sell a large proportion of their yield to state-controlled plantations, and pay tea tax. The private farmers could retain a proportion of their harvest if they wished. In this way, the state used profits from tea to mobilise the merchants and ensure that adequate food and materials were taken to the northern frontier. The founders of the dynasty leveraged their enormous prestige and authority to achieve this level of control over the economy. Nevertheless, their success in mobilising the merchants relied on the state monopoly of the tea supply. This level of control came at the expense of closely monitoring private farmers. Enforcing and monitoring the rules regarding the deposit system and the collection of taxes was cumbersome. The state needed accurate data regarding farmers liable to pay deposits and taxes, how much they should pay, and how the state could collect.

Problems began to emerge, and the state’s monopoly faced challenges. The liberal economists identified these issues – government control was weakening, the cost of enforcing the rules was increasing, the collection of tax and deposit was getting unwieldy, and the merchants were becoming resistant to the arrangement. These views held sway, and reforms were introduced: a new policy called “*Jiaoyinfa*” (method of submitting vouchers) was declared.[[51]](#footnote-53)

Under this system, merchants who conveyed materials to the northern frontiers continued to do so at their own cost, but they obtained vouchers (*jiaoyin*) after delivery. These vouchers were redeemable when submitted to the capital. At the same time, they also obtained the right to collect tea from southern regions and sell it.[[52]](#footnote-54) As an additional incentive, the state also issued vouchers for aromatic substances, medicine, rhino horns, ivory (*xiang*, *yao*, *xi*, *xiang*), and other precious items. The more exotic the items were, the greater the profits for the merchants.

However, the merchants began exploiting the arrangement to their advantage by increasing the price of the food and materials they sold on the northern frontier. By artificially inflating prices, they could obtain vouchers of higher value in the capital to obtain more tea in the southern regions. The amount of tea they could obtain in the south was stable, which led to the depreciation of the tea vouchers, and in turn to the reduction of tax collected by the government because the merchants could take more tea from the local trade centres than before. Moreover, they were allowed to deal with farmers directly.[[53]](#footnote-56) While the price of collecting the tea at the trade centres was relatively fixed, farmers preferred dealing with the merchants instead of the state because they could avoid taxation. Tax concealment and evasion occurred, which led to the reduction of tax collected by the state. The government bore the loss while tycoons or top merchants soaked up the most significant portion of the profit.

This state of affairs was a cause of concern for the state and the court. They decided to charge more by collecting sales tax from the merchants and rent from the farmers. This led to unending squabbles over whether the state should rely on “the invisible hand” behind the scenes or intervene directly in the market. Famous scholar-officials, including Wang Anshi, Ouyang Xiu, Sima Guang, and Su Che, expressed their opinions in support of or opposing related proposals and reforms.[[54]](#footnote-57) However, these unending debates did not in the least stem the losses being sustained by the state.

In the Zhenghe period, Huizong and Cai Jing adopted a mixture of policies to reform how the industry was regulated and ensure that a revenue stream derived from the tea trade would return to the state coffers. Their policies brought rapidly growing revenues to the state and increased tea production. Below is a chart showing the trends in state profits in different periods:

Table 1. State profit by period (compiled by Qi Xia)[[55]](#footnote-58)

|  |  |
| --- | --- |
| Year | Profit (*guan*/string of cash=1000 *wen*) |
| 964–976 | 4,000,000 |
| 1013–1014 | 3,000,000 |
| 1021 | 1,500,000 |
| 1057–1058 | 1,094,093 |
| After 1059 | 1,175,104 |
| 1109 (Huizong) | Over 1,840,000 |
| 1112 (Huizong) | Over 4,000,000 |
| After 1131 | 2,400,000 |
| 1154 | 2,690,000 |
| 1155 | Over 2,700,000 |
| 1174 | 4,200,000 |

We can conclude from Table 1 that Huizong’s court brought in considerable revenue and rescued the state’s share in the tea market. Huizong and his subordinates instituted financial initiatives to launch reforms to the industry and institutionalize tea-related market activities. Had the Northern Song government not collapsed, this would have been a considerable achievement despite the many criticisms often levelled against Huizong’s court. Their political and financial achievements brought significant advantages to the state,[[56]](#footnote-59) even as the liberal economists continued to attack the policies of taking profit from the private sector. However, proponents of planned economies would favour this if Huizong and his court truly represented the role of a central government. We do not need to settle once and for all the unending debate between the two camps of economists since the debate rages on today. Nevertheless, Huizong and Cai Jing’s economic theories and practices significantly surpassed many of those highly reputed scholar-officials.

**Punishment and rebels**

Since profits from the tea industry were enormous, the industry naturally attracted its share of criminal elements and illicit goings-on. Karl Marx cites T. J. Dunning in *Das Kapital*, saying, “With adequate profit, capital is very bold. A certain 10 per cent will ensure its employment anywhere; 20 per cent certain will produce eagerness; 50 per cent, positive audacity; 100 per cent will make it ready to trample on all human laws; 300 per cent, and there is not a crime at which it will scruple, nor a risk it will not run, even to the chance of its owner being hanged.”[[57]](#footnote-60) Net profits selling tea in the Northern Song could easily reach well over 300 per cent. The temptation for merchants, farmers, and peasants to commit illegal deals was irresistible. This was why the government instituted strict laws and orders to control the industry.

For example, as recorded in the “Treatises on Food and Commodities” in *Song History*, if farmers did not submit their tea to the state-run trade centres or conducted private deals with merchants (before the reforms), they would be sentenced according to the value of their deals. If farmers destroyed their tea bushes (in order to evade tax or rent), they would be fined the value of the tea the destroyed bushes would have produced. Tea plantations that produced less than the stipulated amount would be removed. If government officials illegally traded state-owned tea of a value of 1,500 *wen* or more, they would be sentenced to death. As this punishment was deemed too severe, it was later modified such that government officials found stealing and selling state-owned tea of a value over 3,000 *wen*, would be sentenced to imprisonment and their faces tattooed (as a form of shaming). Anyone who bore arms to form a gang to engage in the illegal tea trade and resisted arrest would be sentenced to death. Anyone who sold inauthentic tea weighing one *jin* would be sentenced to one hundred strokes of the cane; selling twenty *jin* of inauthentic tea would result in a death sentence.[[58]](#footnote-61) These severe punishment codes reflected the seriousness with which the government monitored the industry and controlled the farmers, peasants, and merchants.

The penal codes targeting merchants, farmers, and peasants also revealed that many people were involved in illegal trade, tax concealment, and evasion. When the government wanted to collect more tax, rent, and tea from the farms, the farmers could not keep much of their tea produce. They regarded tea as the result of their labour and devised means to circumvent government levies. They could conceal the produce, lie about the size of the tea growing area and the number of bushes in their plantations, bribe officials, replace fresh and high-quality tea with old and poor-quality teas and sell them to the state-run trade centres.[[59]](#footnote-62) Worse still, they could rise in rebellion as they did in Sichuan Pengzhou in 1077, where over five thousand rebels came together to fight against the oppression of the local government.[[60]](#footnote-63)

These violent events resulted from the imbalanced distribution of interests and profits among the various parties involved in the tea trade. Since a consensus regarding the tea reforms had never been reached among the scholar-officials, objections and criticisms emerged continuously. Criticisms directly attacking the most successful case of the tea reforms during Huizong’s reign were harsh. For example, Li Gang, a famous scholar-official and military commander, lamented in his *Anthology of Mr Liang Xi* that:

The profit from the tea and salt industries lay in the hands of the local governments at the beginning of the dynasty. The local governments were thus rich and prosperous. From the Chongning and Daguan periods of Huizong’s reign onward, the profit lay with the central government, and thus the central government was rich and powerful. Soon the royal court took all the profit and used it up on objects of pleasure, banquets, and bestowments, and all the profit under heaven was all gone![[61]](#footnote-64)

Nevertheless, one wonders how valid such criticisms were, as Huizong and his trusted subordinates, like Cai Jing, who was responsible for most of the tea reforms during his reign, have usually been blamed for causing the collapse of the Northern Song government.

**Why reforms?**

A state needs to balance its expenditure and income. While its expenditure can be an unknown abyss, its income consists of several sources widely recognized in human history. Taxation in the form of cash, materials, or draft labour was one of these sources; monopoly and direct control of a particular industry was another. Giving room to private businesses and collecting only tax from them leaves room for the existence of private interest holders, while the latter allows only the state to own and operate. The interplay between the Emperor, the central and local governments, merchants, farmers, and peasants shaped the development of the Northern Song tea industry.

As Patricia Ebrey describes, the expenditure of the Northern Song government during Huizong’s reign was composed of tributes, military expenses (e.g. soldiers’ rations and salaries), grain supplies, the construction of palaces, the Northeast Marchmount (Genyue), Daoist temples, plantations, and libraries, rituals, the Flower and Rock Networks (*huashigang*), salaries for officials and clansmen, charity, and, last but not least, cultural and artistic activities.[[62]](#footnote-65) Any item could be a bottomless pit leading to a fiscal deficit. Huizong’s court needed to raise adequate money to launch these projects. High-profit industries such as salt and tea definitely came to their attention, but the profits had to be split between different parties. Two-thirds were retained at the local/prefectural governments, and one-third was submitted to the central government/Ministry of Revenue and the Inner Treasury (Privy Purse of the Emperor).[[63]](#footnote-66) In the “Treatises on Food and Commodities” chapters in *Song History*, Tuo and others alluded to the question of the increase of redundant personnel and the corresponding increase in their salaries during Huizong’s reign.[[64]](#footnote-67) It is known that Cai Jing favoured a large force of officials to please Huizong, and the tea industry was chosen as an avenue to generate profit for the court. Tuo and others continued to upbraid Huizong’s court for spending money on extravagant building projects, the Flower and Rock Network, and the salaries of greedy officials, which constituted the popular historiography of denigrating Huizong and Cai’s achievements.[[65]](#footnote-68) Following the line of thought developed by Ebrey, we now realize that to only criticise Huizong on account of his lavish expenditure on cultural and artistic activities does not do justice to Huizong and his subordinates’ attempts to save the government from financial ruin.[[66]](#footnote-69) The reforms of the tea industry should be examined against this backdrop.

Cai Jing’s personal statements regarding the reasons for launching tea reforms are a convenient point of departure. In his remarks to Huizong in 1102, recorded in *Song History*, he articulated that after the Qingli period, the legal codes concerning state-run policies in the tea industry were flouted openly and the illegal trade in tea flourished unabashed. New reforms giving the merchants more freedom were therefore necessary. When the merchants competed with the state in the market, the state lost the profit. It was, therefore, essential for the state to return to state-run policies and prohibit private deals between merchants and farmers.[[67]](#footnote-70)

Afterwards, with Huizong’s support, Cai re-designed the official establishment controlling the local tea trade and built many more new trade centres in various regions.[[68]](#footnote-71) We understand that these policies would break up long-held connections between old interest holders. Merchants who had long-term collaborative relationships with certain trade centre officials might have developed their own power circles to evade state control. Bribery was, therefore, easy and common. Re-designing the official establishment and building new trade centres would break up their power circles, and the state would stand to gain from it. As expected, this act aroused criticism from parties with existing interests.

Cai Jing and his colleagues’ responses to the rapidly changing tea market were very efficient. Four years after they re-designed the official establishment of the trade centres, they implemented a new official system and allowed merchants to obtain vouchers from the central and local governments and purchase tea directly from the farmers. The government made its profit from taxation and the sale of vouchers. The *Song History* authors were of the opinion that the tea trade flourished after these reforms came in.[[69]](#footnote-73) However, the tea industry had been prosperous all the time. A more convincing interpretation of the increase in government profits is that the state discovered more tea transactions than before. Tea transactions unknown to the government in the past were now brought to the light because of close monitoring. Therefore, the state could profit more by “discovering” these “new” transactions. Responses from the central government in planned economies are usually prolonged and bureaucratic, but Cai and his colleagues managed to launch reforms rapidly and efficiently.

We can deduce from what the Emperor and his subordinates implemented during Huizong’s reign that financial considerations were essential to launching tea reforms but were not the only cause. Re-situating the state at the centre of the tea market, re-instating the state's power in the industry, re-designing the official establishment, and re-distributing the powers among the local officials were among the concerns of the central government throughout the history of the Northern Song. Attributing these phenomena to Huizong’s personal interests ignores how Huizong and his subordinates strove to save the state from an economic abyss.

**Adding value to tea and product differentiation**

As much as the tea industry provided revenues to the state, the government wanted even more. A state monopoly, sales tax, taxes and levies on farmers and peasants and rent on plantations were just the start. The government officials realized that varying the tea market by creating different categories of tea would bring in significantly higher profits. In this way, tea could be sold in different categories at higher prices. Modern economists would term these acts as “value-adding,” “marketing,” and “product differentiation”. These strategies include diversifying the features of the products, adding new brand names to generic products, and packaging products in innovative ways to attract more customers and sell the products at higher prices.[[70]](#footnote-74) The Northern Song scholar-officials made good use of these marketing strategies.

Diversifying features

When considered in this context, the writing and promotion of the *Daguan Treatise* can be seen as an attempt to add economic value to the tea. We may recall that the state-owned plantations in Jian’an and the government took the initiative to promote their tea. Thus, the *Daguan Treatise* not only theorized and institutionalized tea practices but also served as a market guidebook to promote an idealized tea culture and a model for an industry in which the state had a significant interest. Promoting appropriate utensils also added cultural and economic value to the tea industry.

Differentiation

Raw tea was all very similar, but the government had the economic incentive to artificially differentiate the tea using different production techniques, grades, packaging, and price.[[71]](#footnote-75) We do not know whether there were any differences in terms of the taste of the tea. Nevertheless, the specification and differentiation of the quality, types, production techniques, and price of tea as an economic construct is a fascinating phenomenon.

Records in the *Comprehensive Examination of Literature* (*Wenxian tongkao*)reveal that the Northern Song government singled out some specific tea types at the beginning of the dynasty.[[72]](#footnote-76) At that time, tea was categorized into *sancha* (loose tea), *piancha* (tea cakes), and *lamiancha* (wax-surfaced tea cakes). The government bought tea at low prices and sold it at three to four times what they paid for it:

Table 2. Profit by tea types[[73]](#footnote-77)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tea type | Buy (*wen*/*jin*) | Grades | Sell | Grades |
| *lamiancha* | 35–190 | 16 | 47–420 | 12 |
| *piancha* | 65–250 | 55 | 17–917 | 65 |
| *sancha* | 16–38.5 | 59 | 15–121 | 190 |

The *lamiancha* referred to tea from Jian’an, the tea favoured by the *Daguan Treatise*. *Sancha* and *piancha*, referring to how the tea was packed, could be found anywhere in the south. The government probably set the grades to differentiate qualities and diversify the market. The artificial differentiation would add value to the initially generic tea.

Associating specific tea types with certain production techniques was an economic strategy to enrich the stories behind the products. Northern Song scholar-officials employed this marketing strategy just like modern tea merchants. The processing and preservation techniques probably also added value. Wax-surfacing, steaming, compressing, baking, and mixing with aromatic substances were associated with the long-term preservation, better flavour, and pleasing fragrances demanded by many Northern Song tea drinkers.

Creating new brand names

Tea texts compiled by the Northern Song scholar-officials have mentioned various tea brands, such as Jian’an White Tea, which had the endorsement of the royal court, Ding Wei’s Large Dragon-phoenix Tea, Cai Xiang’s Small Dragon Tea Cakes, and the various tea brands mentioned in multiple tea texts.[[74]](#footnote-78) The scholar-officials came up with numerous labels for tea of the same type, quality, and origin. Tea of a homogeneous nature probably tasted the same, but the addition of brand names elevated the economic value of generic tea. Calling the same tea different and more appealing was part of innovatively packaging the tea products. Ding Wei and Cai Xiang “invented” Dragon-phoenix tea and Small Dragon Tea. This was little more than branding the same tea grown in Jian’an. They devised new methods of categorizing the tea and impressed the packages with beautiful dragon and phoenix patterns using metal stamps.[[75]](#footnote-79)

Tea was a value-added and frequently advertised commodity and luxury in the Northern Song. It drew the attention of the reformers because it was such an important source of profit for the state. The value-adding strategies were a cultural and economic construct built upon a consensus among the cultural and political elites. The economic value behind the tea provided sufficient incentives for the scholar-officials to invest their energy and time in diversifying the tea market by artificially creating different categories for the tea.

**Exportation and tea-horse trade**

Since tea was a product desired both in China and abroad, the Northern Song government attempted to make it a strategic item in diplomacy and military affairs. The central government controlled tea exports to regions inhabited by the nomads through a mechanism which later became the famous tea-horse trade in history.[[76]](#footnote-80) Paul Smith and others have conducted detailed studies of the history of the tea-horse trade,[[77]](#footnote-81) but a question remains: Why was tea used for trading horses but not other products?

Besides horses, the nomads produced their own strategically important products like salt and foodstuffs. The Northern Song government therefore could not base its trade with these nomads on these commodities. The government needed a product they could entirely monopolize and control to trade for militarily strategic items. In Chapter 1, we mentioned that many herbs could replace tea. Why were *shashen* or lotus seeds not chosen to replace tea? Decoctions made of *shashen*, lotus seeds, and other herbs could provide similar medicinal qualities or daily nutrition. Scurvy (from Vitamin C deficiency) and other health-related problems, which the nomads suffered from, could well be prevented or alleviated by drinking decoctions of these herbs. Moreover, these herbs could be preserved for a long time, provided they were treated correctly. Why, then, did tea rise to prominence?

The cultural construct of tea made tea culturally attractive, while the economic construct made tea widely popular. These large-scale cultural and economic phenomena led to the popularity and uptake of tea among both the nomads and sedentary people. When tea was singled out from other products in the market, the economic value of tea elevated it to a militarily strategic item. Tea grew in southern China only and was easily controlled by the government. The geographic distribution of tea made it an outstanding product over which the Chinese had a total monopoly. *Shashen* would be a good alternative to tea, but its production area, the Yellow River Basin, was under constant military threat. Lotus seeds that grew only in the south were not of high cultural value since the cultural construct of lotus seeds was not as popular as tea. After the Chinese scholar-artists began a major cultural campaign to promote tea for several hundred years, tea became an indispensable strategic item favoured by the Northern Song government. By maintaining the historic popularity of tea among the nomads, the Northern Song government successfully built on the long-term cultural and economic tradition of promoting tea and continuously used tea to trade for what they desired.

Previously the Northern Song government used silver to trade, but eventually, they found that the silver-horse trade was not as cost-effective as the tea-horse trade.[[78]](#footnote-82) The Northern Song government later established the Tea-Horse Agency to centralize the management of trade affairs and demanded that tea plantations in the Sichuan area trade horses with the Tibetans.[[79]](#footnote-83) It is recorded that during Shenzong’s reign and under Wang Anshi’s reforms, the Tea-Horse Agency used tea to trade with the Tibetans and procured about 10,000 horses annually starting in 1074[[80]](#footnote-85) and reaching up to 20,000 horses annually as the trade developed.[[81]](#footnote-86) In 1116, during Huizong’s reign, the number of horses procured had reached a record high of 45021.[[82]](#footnote-87) By using tea instead of silver to buy horses, the precious metal remained in China, protecting the economy and preventing currency inflation. The massive surpluses of the Sichuan tea industry were traded for valuable horses. Tea grown in other parts of China would be transported to the north for strategic military uses and was traded internally for everyday consumption. The value-adding processes and cultural and economic construct of tea helped spread the reputation and popularity of tea. The Northern Song government was the stakeholder that benefited most from the trade.

Production and distribution of tea utensils

**Ceramic vessels**

Tea utensils were part of the economic construct of the tea industry. The active production and wide distribution of tea utensils reflected how popular the tea-drinking cultures were and how successful the economic construct was in the Northern Song.

Types

As discussed in Chapter 1, various tea utensils made up part of the sophisticated Northern Song tea culture and economy. Tea bowls could be categorized into single tea bowls and bowls with pedestals or supports. The spouts of ewers needed to be specially designed to accommodate the tea-tipping practices. Accompanying jars and pots for holding water could be ordinary vessels. Incense burners would be part of the assemblage of tea utensils since they were indispensable at tea gatherings. The openwork design of the incense burners, which allowed the emission of fragrance from the burning of aromatic substances, had its origins in the Han Period incense burners and the bronze vessels of earlier periods (fig. 2.4).

Most surviving Northern Song tea utensils are ceramic, ranging from stoneware to celadon or porcelain, judged depending on their firing temperature, clay and glaze types, and degrees of water porosity.[[83]](#footnote-88) Glazed ceramic tea bowls give us a glimpse of the aesthetics and economic preferences of Northern Song tea lovers, and the glaze determines the colour of the ceramic utensils. Ordinary people probably used unglazed stoneware or glazed porcelain bowls of cheaper quality, while the cultural elites preferred those with sophisticated designs, for example, multi-coloured or purely monochromatic bowls. Monochromatic bowls are not necessarily dull or uninteresting. Instead, their colour tone can be so pure and subtle that they exhibit a type of restrained beauty. Multi-coloured bowls have various patterns, such as the hare’s fur pattern discussed in Chapter 1, the oil-drop pattern (*youdi*), the dove’s feather pattern (*zheguban*), and *tenmoku*.[[84]](#footnote-89) Varying the firing temperature and oxidization and reduction processes in the kilns would produce various glaze colours.[[85]](#footnote-90) The famous *tenmoku* bowls stored in Japan (fig. 1.7) were made using these processes. Most of them date to the Southern Song. Although there is not enough evidence at this point, it is possible that some of them were produced in the Northern Song. Since the *tenmoku* bowls were produced in kilns called “dragon kilns” (*longyao*), whose earliest construction could be traced to the first millennium BCE,[[86]](#footnote-91) the accidental achievement of the so-called *tenmoku* patterns would have probably taken place at earlier times.

Regional distribution

Almost every region in Northern Song China had kiln clusters able to produce tea bowls and ewers. In the north, there were the Cizhou (Hebei), Dingzhou (Hebei), and Yaozhou (Shaanxi, fig. 2.5) kiln clusters. In central China, there were famous kiln clusters such as the Ruzhou (Henan, fig. 2.6) and Guan (official) clusters around the capital. In the south, there were the Changsha, Longquan, and Jianyang kilns.[[87]](#footnote-92) Local tea lovers would usually use utensils produced in nearby kilns due to the high transportation costs of the precious utensils specified in the tea texts (like the Jian ware specified in the *Daguan Treatise*).

Production

Producing ceramic vessels required a significant investment of material and labour resources. First, kilns catering to specific local needs were built. In northern China, the so-called “bun-shaped kilns” (*mantouyao*) were constructed because their design fitted local geological conditions, while in southern China, dragon kilns built on long slopes of hills were preferred.[[88]](#footnote-93) Secondly, clay stones, glaze stones, water, and fuel needed to be transported to the kiln site. Some kiln sites were built next to the river bank so potters could easily draw water to mix with the clay and glaze stones before trampling and grinding them into softer forms. After wheeling and shaping the clay into desired shapes, glaze and pigments might be applied on the surface. The utensils were then put into the kilns for firing. To bring out the desired colours on the utensils, large amounts of firewood and charcoal were needed to heat under oxidized or de-oxidized conditions. Experienced masters would supervise the entire process, but they also needed ordinary workmen to take care of the routine and onerous labour, such as collecting firewood from the forest, drawing water, and carrying raw materials to the workshops. During the firing processes, which could take several days, and the reduction processes, which could take weeks, the masters needed to be very attentive to the colours of the fire and other temperature indicators, which showed the approximate temperature ranges at a time before the invention of thermometers.[[89]](#footnote-94) Sleepless nights were common in peak seasons because a kiln might contain thousands of ceramic utensils. Any error in the process could result in an entire kiln of ruined or sub-par utensils, which could bankrupt a workshop.

**Dragon kilns**

The southern Chinese chose to build long and narrow kilns on slopes of hills, resembling dragons lying on the hills. In the Northern Song, such dragon kilns were very common in the Fujian Jianyang area.[[90]](#footnote-95) Of these, the Yulinting kiln cluster is worth mentioning here.[[91]](#footnote-96) It is located in the Mount Wuyi area and belonged to Chong’an county in the Northern Song. Six sites of ruined kilns on six different hills were located in archaeological surveys conducted at the end of the twentieth century by the archaeological team of the Fujian Provincial Museum. Our focus here is the most prominent site, which consisted of two kilns (fig. 2.7 and fig. 2.8). In this area of about 2,300 m2 were found the foundations of the two kilns, potters’ workshops, ponds, wells, roads, drainage ditches, and vast quantities of ceramic shards that were identified as remains of black-glazed Jian ware. Sources of clay and glaze stones in neighbouring areas are abundant. Two creeks surrounded the kiln site when we first visited it in December 2019.

One can imagine that the potters of the Northern Song working in these kilns would draw water from the creeks and wells and store it in the ponds. When needed, the water would be used to filter sand from the clay and to trample and mix the clay powder. Today, the creeks are connected to the Chongyang Creek, the Jian Creek, and the Min River, and then eventually run to the sea. If these creeks were connected in the Northern Song and were linked to the Gan River (probably by some land transportation), as was very probable, the tea and utensils produced in the Jian’an area could be shipped to the Yangtze River and the Grand Canal and efficiently reach the capital. Shipping the utensils to Zhejiang by sea was another way to reach the Grand Canal. Firewood from the nearby mountains in the Wuyi area was plentiful, and making charcoal would have presented no challenge.

Only the foundations of the two kilns are left to us, while all the above-ground structures are gone. The length of Kiln One is 73 m, as measured along the slope. Its average incline is 18°, 26° at the steepest point, and 13° at the most level point. Kiln Two is 113 m long. Its average incline is 19°, 30° at its steepest and 15° at its most level. According to archaeologists’ estimates, Kiln Two could yield over 80,000 items per firing. Since the above-ground structures of the two kilns have disappeared, we can take a modern kiln that imitates the dragon kiln structure as a reference. This modern kiln belongs to a potter called Sun Jianxing. It is only 10 m long with an incline of about 17° (fig. 2.9). Sun’s kiln mainly yields Jian-style stoneware, that is, the black-glazed bowls. The front of the kiln is where the firewood is burnt. The rising heat is directed into the long, slanting fire chamber covered by thick bricks, preserving the heat inside. There are tiny holes at selected places in the fire chamber for the potter to look into the chamber to gauge the fire type and temperature ranges, although electric thermometers are used nowadays. Smoke generated by burning the firewood and charcoal is emitted through a chimney at the back of the chamber at the peak of the artificial hill. Nowadays, we can still identify the front, the foundation and remaining walls of the fire chamber, and the end of the Yulinting kilns (fig. 2.10 and fig. 2.11), which indicate that the operation principles of the Yulinting and Sun Jianxing’s kilns are similar. The Yulinting kilns are much longer and twist a little at the centre, similar to the twist of Kiln One seen in fig. 2.10. This twist point was probably built to slow down rapid elevations of heat and maintain a steady heating environment in the kiln. The delicate control of how the heat was raised reflected the sophistication of the kiln construction techniques. The massive output of one firing of one of these massive kilns meant that the Yulinting kiln clusters provided a stable supply of high-quality Jianware to the market. Some high-end products might be shipped to the capital for use by the cultural and economic elites.

The *Daguan Treatise* authors gave their Fujian-centric tea standards and preferences high political and cultural status and expected tea practitioners to follow their prescriptions. They institutionalized tea-making practices and tea-drinking preferences through the dissemination of the text. By launching the reforms, Huizong and his subordinates regained control of the tea industry, monopolized the tea market, garnered the greater share of the profits of the tea trade, and managed the southern tea and utensil production industries with relative ease. No merchants could compete with the government in this market. Simultaneously, Huizong and his subordinates utilized the fame of the Jian’an tea and utensils. By prioritizing the Jian’an White Tea, praising the black-glazed Jian wares, grading and categorizing tea types, preserving the tea for a longer time by referencing the drying and processingtechniques, and promoting the tea-tipping practice, Huizong, his subordinates, and many scholar-artists and -officials added a great deal of cultural and economic value to tea. It was no coincidence that tea became popular in both the Chinese and non-Chinese speaking regions, with the scholar-artists and officials participating in a large-scale economic phenomenon that reified the rarity and refinement of tea and utensils.

**Aromatic substances**

The production and distribution of aromatic substances from Northern Song-controlled and foreign areas reflected how the Chinese cultural elites economically constructed the rarity and exoticism of the aromatic substances. We examine how the cultural elites moulded the popular impressions about the aromatic substances in their texts. Both the burning of the aromatic substances and the specially designed incense burners used in the process were parts of this economic construct.

Geographical sources of aromatic substances

Most of the aromatic substances the cultural elites preferred and indicated in their *xiangpu* were exotic. Many came from Southeast Asian, South Asian, Persian, and Central Asian regions. A few of them were domestic, coming from the Canton, Guangxi, and Hainan regions. The state authorities grouped the aromatic substances with other items such as rhino horn, ivory, amber, pearls, agate, crystals, and exotic timbers.[[92]](#footnote-97) These exotic items captured the attention of the cultural elites. The medicinal properties they were believed to possess were discussed briefly in Chapter 1. However, I would argue that aromatic substances were subject to a cultural and economic construct, making them appealing and widely sought after. If it had not been for concerted efforts by the promoters of these exotic items that had no practical use, they would not have become a sought-after luxury among the cultural elites.

Ding Wei’s *Legends* mentions several geographical sources of aromatic substances.[[93]](#footnote-98) Champa (Zhancheng) in Vietnam yielded tambac and *qianxiang*, which would be exported to Canton or Persia. *Xunlu* and frankincense came from Persia, where trees yielding aromatic substances grew. The geology there was distinctive, as it is still today, with practically no topsoil and very little rain. These trees grow in rocky areas only. According to Liu Jingmin, if planted in soil, they would not yield aromatic substances.[[94]](#footnote-99)

Production and categorization were also common strategies that the *xiangpu* authors employed in making an economic construct of the consumption of aromatic substances. As an example, Ding Wei’s Legends again described how rare the aromatic substances from the Hainan and western Canton regions were. The indigenous people on Hainan Island made their living mainly by farming, and only in the winter did they enter the mountains to collect aromatic timbers. In the western Canton regions, the indigenous people chopped down only mature aromatic timbers and left the immature ones untouched. They were careful to preserve the ecological balance with their environmentally friendly habits.[[95]](#footnote-100) As a result, the aromatic substances they collected and preserved were very natural. Ding Wei further elaborated that ten thousand *jin* of *Huangshan* could be refined to one hundred *jin* of *qianxiang*, while one hundred *jin* of *qianxiang* could, in turn, be refined into only a dozen *jin* of *chenxiang*.[[96]](#footnote-101) The meticulous differentiation of products was meant to add value to the aromatic substances, echoing similar steps taken with the tea brands and categories.

Trade routes of aromatic substances

We can now investigate the route by which the aromatic substances travelled to the capital. The Fujian and Cantonese sea merchants shipped aromatic substances from the Hainan and Canton regions to the Hangzhou harbours.[[97]](#footnote-103) The sea merchants would bring not only aromatic substances but also other exotic items mentioned above. Foreign merchants, especially Arabs and Persians, would have brought to Quanzhou and Hangzhou aromatic substances and other exotic products collected along the way in places like Champa and Srivijaya in Indonesia.[[98]](#footnote-104) Southeast Asian merchants also played a role in these transactions. Thus, the trade routes between China, Southeast Asia, South Asia, Persia, and Arabia were well-established and highly developed in the Northern and Southern Song periods.[[99]](#footnote-105)

Preservation of aromatic substances

While the *xiangpu* authors did not pay much attention to the preservation techniques of aromatic substances, the medicinal texts such as *Lei’s Treatise*, *Materia Medica*, and *Imperial Pharmacy* contain detailed records of how they were processed, preserved, and used.[[100]](#footnote-106) Here we can see that the medicinal practitioners and the *xiangpu* writers had different agendas. The former were concerned with the aromatic substances’ actual medicinal functions and preservation methods, while the latter were concerned with fashioning a luxury image for the aromatic substances. They stressed the cultural sophistication of using aromatic substances, the exoticism associated with them, and the status associated with using them in the presence of guests. To be sure, indigenous people had their own processing and preservation methods to treat the fresh aromatic timbers they collected, but there are no original records of these. Their methods were either unknown, incorporated into the methods recorded in the medicinal texts in digested form, or turned into anecdotal information that the scholar-artists could bandy about at their gatherings.

Government control

The scholars’ notes record the profit brought in by the aromatic substances. The Southern Song scholar Zeng Zao recorded that a type of aromatic substance called *baiduru* was worth two hundred thousand *wen* per tael when it first appeared in the capital, and Cai Jing burnt two to three taels of it at a banquet.[[101]](#footnote-107) With two hundred thousand *wen,* one could have purchased a first-class property ranging in size from twenty-five to one hundred acres, according to Qi Xia’s conversion.[[102]](#footnote-108) Although Zeng Zao’s note provided only an anecdotal account, it could provide supplementary information on how expensive the aromatic substances were. The value of aromatic substances is also recorded in other notes from the Southern Song.[[103]](#footnote-109) Ambergris was the most expensive substance of all. The best quality ambergris was worth hundreds of thousands per tael in Guangzhou, the second best fifty-sixty thousand.[[104]](#footnote-110)

With returns comparable to that of tea, it was only natural that aromatic substances drew the attention of the central government. As mentioned above, the state monopolized the tea, salt, aromatic substances, and alum markets.[[105]](#footnote-111) The state controlled the industry by imposing heavy taxes at every turn. Labour tax was probably imposed on the domestic indigenous peasants who harvested the aromatic timbers. From the foreign merchants, sales tax was collected.[[106]](#footnote-112) The state also established offices in the capital, Guangzhou, Hangzhou, and Quanzhou areas to monitor transactions and prohibit private trade.[[107]](#footnote-113) When the Southern Song government gradually resumed control of the markets in 1130, three years after the collapse of the Northern Song government, over 86,000 *jin* of frankincense, classified into thirteen grades, was traded in the Quanzhou harbour. They were transported in units of *gang* (literally meaning “network,” here it might mean “a package”), where one *gang* was made up of three thousand *jin* on land, while ten thousand *jin* was one *gang* on water.[[108]](#footnote-114) According to Qi Xia’s estimates of the total revenue in three trade centres in 1154, tea made up 13%, aromatic substances and alum 5.3%, and salt was the highest at 75.8%.[[109]](#footnote-115) The significance of the per centage of revenue taken up by tea and aromatic substances should not be ignored.

Even though these statistics came from sources dating to the early Southern Song, we can imagine how important the revenue of tea and aromatic substances was to the government of the Northern Song. In the Northern Song, the punishment for illegal trading activities was severe. In the Taiping Xingguo period of Taizong’s reign, illegal transactions worth over fifteen strings of cash were punished by a tattoo on the face and banishment to offshore islands. Imprisonment was in store for illegal trades above fifteen strings of cash. In 994, the punishment escalated. People engaging in illegal trade involving up to four strings of cashwould receive sentences of tattoos and be pressed into service as convict soldiers.[[110]](#footnote-116) The state adhered strictly to the categorization of the substances, closely monitored transactions, regulated transportation and packaging, and showed great determination in exercising the penal codes.

***Qin***

To produce a *qin*,an artisan needs to assemble a whole array of raw materials: boards of wood, lacquer, silk strings, metal pieces, and stones.[[111]](#footnote-117) Many scholars have studied the mechanism and acoustic properties of the *qin*,[[112]](#footnote-118) but the acquisition and processing of raw materials for producing a *qin* in the Northern Song has not received much attention. As illustrated below, many of the necessary raw materials came from various parts of China and were assembled into a *qin* in the metropolises of the Northern Song.

Acquisition of raw materials

**Boards of wood**

First of all, *qin* artisans had to collect the appropriate timber and turn it into usable and durable boards of wood. The boards of wood constitute the majority of a *qin*. They give the instrument its basic shape and determine its acoustic properties. Selecting the appropriate timber was the artisans’ most important task. Timbers that were known and available to a Northern Song artisan included the Chinese parasol tree (*wutong*/*firmiana simplex*), catalpa (*zi*/Chinese catalpa/*catalpa ovata*), and cunninghamia (*shan*/China-fir).[[113]](#footnote-119) Modern-day timber scientists have studied them and their properties are listed below:

Table 3. Properties of the different types of timber[[114]](#footnote-120)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Timber | Hardness and strength | Workability | Durability | Deformation and cracks | Elasticity | Texture and gloss | Usual applications |
| Chinese parasol tree | Hard | Easy | High | Rare | High | Straight grain, glossy | Furniture, coffin plates, musical instruments |
| Catalpa | Medium hard | Easy | High | Rare | High | Straight grain, glossy | Furniture, coffin plates |
| Cunninghamia | Medium hard | Easy | High | Easy to deform under high temperature | High | Straight grain, reddish-brown | Architecture, bridges |

The three types of hardwoods listed above are suitable for being turned into boards of wood for making musical instruments that require resonance.[[115]](#footnote-121) They are durable, highly workable, and elastic. Boards made from them can be preserved for a long time. They do not deform easily and can be cut into suitable shapes. Two boards are assembled to form a *qin*. They need to endure changes in air pressure, humidity, and temperature to keep producing the desired tones while holding the shape of the *qin*. A straight and even grain is also essential to produce the desired tones. In contrast, interlocked and knotted wood grains make woodworking more difficult and are to be avoided. These three types of timbers are anti-corrosive, fragrant, and insect repellent. The application of lacquer, which helps prevent erosion and insect infestation, is relatively easy with these timbers. A Northern Song *qin* artisan would not know about the radiation damping, impedance, soundwaves, and other scientific terms used by today’s acousticians to explain the working mechanism of the *qin*,[[116]](#footnote-122) but he would know which type of timber was easy to carve and apply lacquer onto, and which was anti-corrosive, and able to resonate to produce a good sound.

How and where did a *qin* artisan obtain the wood needed for his *qin*? Piecemeal forestry records in the Northern Song can be found in scholars’ notes. Fan Chengda’s *Register of Mounting A Simurgh* (*Canluan lu*; hereafter “*Simurgh* *Register*”), written in or after 1173, could be used as a reference.[[117]](#footnote-123) This book records Fan’s journey from Suzhou in Jiangsu to Guilin in Guangxi *en route* to his posting. Although his note was made in the Southern Song period, and the records about logging in the book refer to a place called Yanzhou (near Hangzhou) in today’s Zhejiang, similar means of obtaining wood would likely have been widely practised in earlier periods and other places as well. In Fan’s description, very few indigenous people chose to cultivate crops; instead, they made their living by planting cunninghamia trees in the mountains. When the wood was transported out of the mountains, the original price was low, but after various taxes were levied, the price had escalated significantly by the time it reached the county and Yanzhou. Fan recorded that the officials of Yanzhou made their profit by taxing the sale of the wood, and he lamented that a piece of timber that started off costing one hundred *wen* would be sold for two thousand in Zhejiang.[[118]](#footnote-124) We can postulate from Fan’s record that the wood for making the *qin* was not cheap. The indigenous loggers would chop down the trees, cut the timbers into easily transportable shapes and sell them to the merchants. Merchants at the county level would arrange for transportation and re-sell them to others. During these transactions and transportation processes, the local governments would charge tax. By the time the wood arrived at a *qin* artisan’s workshop in metropolitan areas like Hangzhou or Kaifeng, it had become a precious and rare commodity, no matter how plentiful it may have been in the forests.

Interesting stories about serendipitous encounters where *qin* artisans acquired distinctive wood were told from time to time. Cai Yong, in the Eastern Han period, accidentally acquired a piece of wood by rescuing it from being burnt and used it to make the “Scorched-tail” (“*Jiaowei*”) *qin*.[[119]](#footnote-125) Li Mian of the Tang dynasty assembled multiple pieces of wood of various types and made two *qin* called the “*bainaqin*” (the *qin* of a hundred pieces).[[120]](#footnote-127) In the tenth century, King Zhongyi (Qian Chu) commissioned an artisan to acquire appropriate wood. This artisan discovered that the pillars of a temple near a waterfall in Mount Tiantai in Zhejiang were made of Chinese parasol wood. He reasoned that the sound of the waterfall might cause long-term changes to the properties of the pillar wood, and thus he used the *yang* (positive/southern) side of the pillars and made two *qin* out of the wood.[[121]](#footnote-128) The Song period scholars inherited this tradition of creating legends about *qin*.

Song scholars elaborated on the tradition of unearthing ancient wood or wood that had been buried underground for years. As historian Yan Xiaoxing notes, an entry from the *Materia Medica* provides such a clue.[[122]](#footnote-129) This is the entry of “*guqinban*” (ancient coffin boards), which was originally written by the Tang medicinal practitioner Chen Cangqi in 739 in his now lost *Supplements to* Materia Medica (*Bencao shiyi*). This entry was later compiled into Tang Shiwen and others’ *Materia Medica*.[[123]](#footnote-130) Chen Cangqi thought that the boards of wood used to make the coffins from ancient tombs were good for curing certain illnesses. Among them, the cunninghamia wood was the best and could be used as the bottom board of a *qin*. The Northern Song scholars further expanded this tradition. Shen Gua described the production of two *qin* made of ancient wood in the chapter “Musical Scales” (“*Yuelü*”) of his famous *Notes by Dream Creek* (*Mengxi bitan*), published in 1087.[[124]](#footnote-131) The first was Lu’s *qin* (*Lushiqin*), made of eroded wood in the early Tang period. The second one was produced by Zhang Yue, who was as famous as the Lei family *qin* artisans. Zhang’s *qin* was claimed to be made of eroded cunninghamia plates taken from coffins of ancient tombs. Zhou Mi, in his *Records of Clouds and Mist Passing the Eyes* (*Yunyan guoyan lu*),recorded the transmission process of the “Spring’s Thunder” (“*Chunlei*”) *qin* made by Lei Wei of the early Tang period, which was considered the best in Huizong’s *qin* collection.[[125]](#footnote-132) Zhangzong of the Jurchen Jin state later acquired it after the collapse of the Northern Song government and subsequently buried it in Zhangzong’s tomb. Eighteen years later, in about 1226, the second last year of Genghis Khan’s reign, it was unearthed from the ground and was added to the collection of the famous scholar-official Yelü Chucai. It was still regarded as the finest qin ever made at that time.[[126]](#footnote-133)

It is doubtful, however, whether a *qin* unearthed from a tomb could still produce a good sound. For example, the “Heavenly Wind, Sea Waves” (“*Tianfeng haitao*”) *qin* excavated from the tomb of the Ming dynasty prince Zhu Tan, cannot be played because the *qin* was not properly dehydrated when freshly excavated (1970-1972).[[127]](#footnote-134) Its bottom board is cracked and deformed beyond repair. We cannot with certainty rule out the possibility that eroded wood and boards from coffins inside tombs or ancient pillars were suitable for making *qin*. Modern *qin* producers prefer wood that is suitably dry.[[128]](#footnote-136) As the Southern Song antique collector Zhao Xihu explained, *qin* unearthed from tombs usually yielded unclear sounds because they were affected by the earthly energy and humidity.[[129]](#footnote-137) For the Song *qin* lovers who might not have access to dehydration methods and preservation knowledge, a *qin* unearthed from an ancient tomb might be merely a curiosity and a collector’s item rather than an actual playable instrument.

**Lacquer surface**

The exterior of the boards was lacquered, and the application of lacquer was a complicated, onerous, and lengthy process.[[130]](#footnote-138) First, an artisan from Northern Song would need to collect raw lacquer from the lacquer trees found in central and southern China. Processing raw lacquer was a dangerous task because contact with the raw lacquer could result in allergic reactions. Treating raw lacquer was a specialised task handled by trained labourers.[[131]](#footnote-139) The processed lacquer would be mixed with the ash of burnt deer antlers, paint, mica, ground pearl powder, and other precious items. The most common colours of the lacquered items are black and red, as those colours were relatively easy to produce.[[132]](#footnote-140) The lacquer artisans needed to evenly apply multiple layers of lacquer on the wood to ensure that the lacquered wood had a beautiful and shiny appearance. A lacquer coating would protect the wood from temperature, humidity, and insects. In other words, the lacquer layers would help preserve the wood for a long time unless it was exposed to abnormal conditions such as overheating. Between applications of lacquer, artisans needed to wait for the previous layer to dry before applying another coat. However, the lacquer prepared as described above could only remain in liquid for a short time. Therefore, the artisan had to repeatedly prepare small quantities of fresh lacquer, which added complexity to the time-consuming process of finishing a *qin*. The process relied on specialised skills and years of experience. The lacquer, and the *qin* it was used to create, represented significant investments of resources and labour.

Textual descriptions of how lacquer was prepared for making the *qin* appear in *Monk Juyue’s Qin Production* (*Seng Juyue qinzhi*) compiled into the *Qin* *Anthology*. Juyue described how the lacquer should be prepared and mixed with specific materials and regulated the lacquer-applying process.[[133]](#footnote-141) The layers of lacquer not only protected the boards of wood of the *qin*, but also changed the acoustic properties of the *qin*.

To the extent that the lacquer surface also adds to the beauty of the *qin*, it provided a source of visual enjoyment to *qin* lovers. The so-called “cracks” on the lacquer surface were given many names, and the scholar-artists treasured them because they indicated the antiquity of a *qin*.[[134]](#footnote-142) The pure-colour lacquer would occasionally be inlaid with glossy and colourful shells, gold inscriptions, or other visually attractive elements. These added much cultural and economic value to the *qin*.

**Silk strings**

The silk strings of most ancient *qin* have usually disappeared due to erosion or damage. Therefore, it is very difficult to analyse the make-up of these silk threads, such as how many fibres were twisted to form one string and what supplementary materials were mixed with the silk threads when they were soaked and boiled to produce the strings for the *qin*. Today’s *qin* artisans specify some of these processes. For example, they mix some Chinese herbs and glue with the silk while soaking and boiling.[[135]](#footnote-143) In the monk Juyue’s writings, the silk strings’ length, their density, the glue used, and the types of fibres were clearly specified.[[136]](#footnote-144)

**Metal and stone components**

A Northern Song artisan would use pieces of metal and stone to decorate other parts of his *qin*, such as the *hui* markers, bridges, and pegs. These have tended to get lost over time. Usually, the metal pieces were made of gold and silver, while the stone pieces could be ordinary stones or pieces of precious jade (nephrites). Gold and silver could be heated, cut, and hammered in a metalsmith’s workshops to a *qin* artisan’s specifications. Jade work required a very specialised set of techniques. First, jade needed to be worked with abrasives, but not with hard metal tools. For jade pegs of the complicated structure shown in the *Xuanhe Period Catalogue of Antiquities* (*Xuanhe bogu tulu*), which was compiled during Huizong’s reign,[[137]](#footnote-145) the jade would need to be worked with expert skill over a long time. To make the thin, circular jade *hui*-markers, a jade cylinder would first need to be drilled out from raw jade, and thin pieces would then be sliced from this cylinder and fitted into the dented areas of the *hui*-markers. The entire process had to be carefully executed, and a minor error would ruin the entire cylinder.

In his *Note on Three Qin* (Sanqin ji, 1062), Ouyang Xiu mentioned that he owned three *qin* made by famous artisans from the early to middle Tang periods.[[138]](#footnote-146) Each *qin* was decorated with different types of *hui* markers, gold on the *qin* made by Zhang Yue, stone on the one made by Lou Ze (a contemporary of the Lei family), and jade on the one made by the Lei family. Ouyang lamented the fact that he was an old man. For that reason, he favoured the *qin* with stone markers because stones did not glitter gaudily like metal. He accorded the stone markers a high moral status for their modesty and integrity and because they unobtrusively but clearly marked out the *hui* positions. Ouyang was not the only scholar-artist to invest the metal and stone components of the *qin* with moral characteristics.[[139]](#footnote-147)

Assembly

After gathering the materials, the artisan started to assemble them into a *qin*.[[140]](#footnote-148) The boards of wood needed to be cut, chipped, and chiselled, and holes were drilled into them to produce the desired shape. Sunken and protruding parts needed to be planned in advance. The size of the various parts of a *qin* is all specified in texts such as Shi Ruli’s *Qin* *Cutting Methods of Biluozi* (*Biluozi zhuoqinfa*), *Book of the Qin* by an anonymous writer that was incorporated into the *Qin* *Plantation*, and *Monk Juyue’s Qin Production*.[[141]](#footnote-149) The general length of extant *qin* dating to the Tang and Song periods is around 120 cm,[[142]](#footnote-150) which accords with the comfortable range of the movement of human arms.

The two boards would then be attached either using glue or pins inserted between them.[[143]](#footnote-151) The thickness of the two boards, which had to correlate with each other, was discussed in detail in Shi Ruli’s text.[[144]](#footnote-152) Shi thought that the acoustic properties of the *qin* would be significantly altered if one board was thicker or thinner than the other or if they were both very thick or thin, but he did not think a certain thickness should be specified. Instead, he argued for an even correlation between the upper and bottom boards. The boards could be made from wood from the Chinese parasol tree or catalpa, but they needed to be cut to the desired proportions.[[145]](#footnote-153) This discussion has led to debates among *qin* lovers in subsequent generations over which kind of wood – the Chinese parasol tree, catalpa, or cunninghamia – should be used for the upper or bottom plates of a *qin* and their corresponding acoustic properties.[[146]](#footnote-154) Shi Ruli’s discussion gives artisans great flexibility to develop their techniques for creating *qin*. Shi allows for a wide degree of flexibility in the number of layers of lacquer and the thickness of the layers over certain areas of a *qin*.[[147]](#footnote-155)

Aromatic woods such as rosewood (*jiangzhenxiang*) and sandalwood (*futanmu*) could be used as supplementary parts or accessories of a *qin*, as indicated in Juyue’s text.[[148]](#footnote-156) Juyue also mentioned that medicinal wood could be used if one could not obtain these aromatic timbers. While the main plates should be made of hardwood, the accessories made of these aromatic and medicinal timbers had the advantage of keeping insects away and releasing a fragrance that was believed to be beneficial to the health of the *qin* players and listeners. In this way, the host would have achieved results similar to burning aromatic substances. The hardwood of the Chinese parasol tree and catalpa gives off a distinctive fragrance, even if the aroma is weaker than burning aromatic substances.

Workshops for producing the *qin*

After ensuring these preparation and production processes were carried out, a *qin* artisan might find it advantageous to set up his workshop in a metropolitan area, where it would be easier for him to procure the various raw materials needed for making the *qin*. Preparing pre-cut boards of wood, silk threads, lacquer, glue, and metal and stone components was a collaborative effort by several specialised craftsmen. Even if a *qin* artisan knew how to assemble all of these materials to make a *qin*, he would still have to acquire them from nearby workshops and merchants. Mixing lacquer and twisting silk threads were complicated tasks. A *qin* artisan who knew how to adjust the acoustic properties might still have to collaborate closely with these other artisans. If the *qin*-maker thought that the tones were not up to scratch, he might ask the lacquer artisan to apply additional layers on the instrument, the silk artisan to add more threads to a string, or the carpenter to thin out certain sections. Famous *qin* workshops, such as that of the Lei family, were probably organised in this manner. The *qin* artisan master who oversaw the whole process might supervise his disciples and other artisans in the joint creation of a *qin*. While the scholar-artists praised a certain master’s creation, such as the *Leiqin*, they were actually complimenting a workshop brand with the name of the master.

The well-established and skilful *qin* artisans would produce *qin* that could generate the best sounds and possess unique beauty on account of the lacquer work, inscriptions, metal and stone components, and the particular fragrance that comes from the wood. The *qin* artisans, similar to the makers of tea and aromatic substances, were concerned with sensory experiences and the enjoyment of the listeners and players. The artisans provided a rich source of inspiration to the scholar-artists with their magnificently crafted *qin*. These were based on the economic value of the *qin* and their related production and distribution networks.

**Transportation**

General landscape

The distribution networks of tea, aromatic substances, and raw materials for making the *qin* covered a wide area of East Asia. In the north were the capital and Central Plains near the Yellow River, covering today’s Henan, Hebei, Shandong, Beijing, and a part of the Mongolian steppe. In the Yangtze River basin, the Sichuan, Hubei, Anhui, Zhejiang, and Jiangsu areas were connected by the Yangtze River and other smaller rivers. Reaching into the deeper south, there were the hilly areas of Hunan, Jiangxi, Fujian, Canton, and Guangxi (fig. 2.1). Carts drawn by draft animals such as oxen, horses, and donkeys were a common sight in the Central Plains, while boats were necessary for the southern areas and the Grand Canal.[[149]](#footnote-157) In the hilly areas, only small carts could be used, and often there was no avoiding using human labour to transport goods. Using these various routes and conveyances, scholars-artists, merchants, officials, and porters could travel throughout the region.

Means of transportation

The raw materials for making the *qin* came from almost every region in the state to the workshops in the capital. Since the *qin* workshops were located in metropolitan areas, they were readily available to the scholar-artists. Exotic aromatic substances from distant territories crossed the sea routes and reached harbours such as Quanzhou and Hangzhou. They were then conveyed to the capital by cart and on boats plying the Grand Canal. Aromatic substances from the Guangdong, Guangxi, and Hainan areas might be shipped by boat and carried by carts to the Central Plains. The drying and processing of aromatic woods helped reduce their weight significantly. Tea and utensils were more complicated to transport. Tea from Sichuan was transported to Tibet along famously dangerous roads[[150]](#footnote-158) or could be taken by travelling scholars and officials, such as Su Shi, to the capital. As we know, tea was planted in remote, mountainous areas and needed to be carried down from the mountains by porters walking along roads too narrow for large draft animals. The Mount Wuyi area that yielded the famous Jian’an White Tea is one of the most dramatic examples of these unaccommodating road conditions (fig. 2.2). After the tea was carried out of the mountains, it was then shipped by boats sailing on mountain creeks that later joined larger rivers. The tea might then continue to be carried by porters over mountains until it reached the metropolitan areas. Ceramic utensils were usually shipped by boats as they were too fragile to be transported on land. In the Northern Song times, their long journey would likely begin at the creeks near the Yulinting kiln cluster. Hundreds of bowls and ewers would have been loaded onto small boats that sailed on the mountain creeks before being reloaded onto bigger boats upon arrival at larger rivers.

What about other means of transportation used in the Central Plains and other less dangerous areas? Many scholars, such as Cong Ellen Zhang, have written about general transportation in the Song period.[[151]](#footnote-159) In Meng Yuanlao’s *Reminiscences of the Eastern Capital* (*Dongjing menghua lu*; hereafter “*Eastern Capital*”) and Zhou Mi’s *Miscellaneous Notes from the Guixin [Street]* (*Guixin zashi*), we can find records of the kind of carts and draft animals used in transportation. The *Eastern Capital* mentions a type of large cart used in the north, “*banzaiche*,” which was driven by two people and pulled by over twenty mules or donkeys or five to seven oxen and could carry a load up to 4000 to 5000 *jin* (about 2000–2500 kg).[[152]](#footnote-160) When unloaded from the boats, tea and aromatic substances would be loaded onto carts like this and transported further north. Using horses to travel and transport light goods was faster but more expensive. According to the *Eastern Capital*, renting a horse to ride within the capital cost less than 100 *wen*.[[153]](#footnote-161) The cost would surely be higher if one travelled to distant places and carried more goods.[[154]](#footnote-162)

For transportation relying purely on human power, a rough estimate would be that a man carrying 60­–80 *jin* of goods could walk about 20 *lî* (1 *lî* = about 0.3 miles)on mountainous roads per day. The direct distance from Mount Wuyi to Nanchang is about 1000 *lî*. It would therefore have taken approximately 50 days on the road to complete this trip on foot. From Nanchang the tea could be re-packaged on larger boats and shipped to the Yangtze River and the Grand Canal.

Porters on the roads

**Working conditions**

Northern Song porters have not received much attention due to the lack of textual records. However, their labour was essential to transport tea, timber, and utensils out of the mountains, especially in the hilly Fujian and Jiangxi areas.[[155]](#footnote-163) We can speculate on their working conditions from the few textual records we have today. Fan Chengda’s *Simurgh* *Register* serves as a good reference.[[156]](#footnote-164) Fan chose to travel by boat in most of his travels within the Zhejiang area. In the Quzhou area, he could comfortably travel on brick-paved roads. In his travels in Jiangxi and Hunan, he rode on boats and sedan chairs and complained about the muddy roads. It rained heavily during his travels away from Yichun and in Yongzhou in the first three months of a lunar year. The roads he and his companions walked on were paved with stones with smooth surfaces.

Sedan chair carriers had to either walk in the mud and sink into the muddy water or walk on the wet stones, which were too slippery to set their feet on.[[157]](#footnote-165) He criticised the local governments for not repairing the roads, which made his travels unnecessarily uncomfortable.[[158]](#footnote-166) His descriptions match today’s road conditions in these areas and reflect a typical scholar-official mindset – he wanted to travel comfortably and enjoy the sights.[[159]](#footnote-168) His experience was worlds apart from that of the porters walking on the same roads.

Fan’s complaints might be prompted by local officials not repairing the roads, or, if they had repaired the roads, the road conditions were still muddy and wet. The Jiangxi and Hunan areas were noted for their humid weather. It could be cold in the winter but not cold enough for the water to freeze. The roads might have been soaked in water and mud for years. Many reasons could have contributed to the smoothness of the paving stones. The stones were probably weathered; years of porter traffic may have smoothed them out, or the road builders intentionally selected smooth pebbles from the rivers to pave the road. Porters might have worn woven hemp or grass sandals when necessary, and occasionally they would have gone barefoot, depending on how comfortable they felt when walking on different types of surfaces. The roads were probably paved for barefoot porters, allowing them to grip the edges of the smooth stones and the space in between the stones with their toes. Fan and his companions wore shoes that trapped them on the muddy roads.

In the Northern Song, porters had to walk on various types of roads carrying heavy baskets of tea or pieces of timber out of the mountains. On our travel experience to the Mount Wuyi area, we found muddy roads, rocky roads, grassy roads, rough roads with sharp stones, roads with stone or brick pavements, roads made of pounded earth, or simply no road at all. There were level roads, steep roads, and nearly vertical roads. Of course, brick-paved and pounded-earth roads were easy to walk on (which the rich Zhejiang local governments could afford), but porters’ roads were dangerous and difficult. The paving stones were arranged to give the roads traction, especially in the case of muddy roads on an incline, which were impossible to climb when wet, no matter the strength of the person. Rocky roads were hot when it was sunny and slippery in the rain. Steps chipped out of the rocks or simple indentations made in them were convenient for the porters. Muddy roads could be found everywhere in the mountainous regions of Fujian, Jiangxi, and Hunan (see fig. 2.2). Travellers’ feet tended to sink into the mud, and they could get stuck. Paving with pebbles would be a better option for these roads to improve conditions.

We can only imagine what accidents might have befallen the porters. Slippery roads might have meant injuries or death, especially when they had to walk along cliffsides with heavy goods on their shoulders. In the winter, they could easily have developed sores and frostbite. They may have risked cutting themselves badly on sharp rocks. Snake bites on grassy roads would have been common. Given these conditions, the high transportation cost of the tea, timber, and aromatic substances was inevitable.

**Food and accommodation along the road**

While wealthy merchants and scholar-artists enjoyed delicious food such as pork, mutton, hare, chicken, fish, and fruit in the capital,[[160]](#footnote-169) the porters probably ate only salted or dried food on the road. Dry buns with salted vegetables were probably their daily fare. If they sailed on the rivers, fish and salted food were common. Petty merchants who plied the same routes would eat better. For porters who carried tea, a portion of their daily liquid intake would be tea when allowed.[[161]](#footnote-170) In all likelihood, their accommodation was of the most primitive kind – in the poor porters’ lodges, on boats, under trees, or in caves out in the wild.[[162]](#footnote-171)

**Loss**

We can imagine that incidental losses are expected in challenging natural conditions. Damage to carts, extreme weather, and poor road conditions might postpone the delivery of goods.[[163]](#footnote-172) Illnesses, injuries, accidents, and deaths of the porters and draft animals also caused unexpected delays. A porter falling from a cliff might take down a load of goods he was carrying, and bandits preyed on the porters. Water transportation was preferred where possible because accidents, damages, and injuries were less frequent. The captain of a boat could keep a close eye on the men under his control, meaning that thefts would be less frequent unless, of course, the boats were looted by pirates. Spoilage of tea, aromatic substances, and timber was frequent if they were not processed and packaged appropriately. The “Storage and Baking” chapter in the *Daguan Treatise* cautions tea collectors to frequently and regularly bake their tea to remove humidity.[[164]](#footnote-173)

Sensory experiences of the porters

The sensory experiences of the porters were drastically different from the scholar-artists living in the metropolises. We do not have any accounts of the appearance of the porters in the Northern Song, but we can postulate that their appearance would not be very different from the porter travellers of today, such as those travelling in Fujian and Sichuan in China and Ceylon.[[165]](#footnote-174) They still walk on the roads that Fan Chengda travelled in ancient times. Today’s tea plantations still rely on manpower to carry the tea out of the mountains.

We can imagine what a porter would look like in the Northern Song based on comparisons between their lives and those of the elites. A porter’s clothing was very simple and coarse. They probably went about bare-chested but with pants that barely covered their genitals in the summer. In the winter, they would probably have worn ragged hemp-woven working suits. Their skin was darker and rougher. Thick calluses covered their palms and fingers from years of handling ropes and goods. These can hardly be compared with the calluses on the delicate fingers of elite *qin* players. Their hands were big with knobby knuckles and short fingernails. Veins bulged on their hands, arms, foreheads, and temples due to prolonged heavy physical work and pressure. Excessive labour led to long-term injuries to their bones and joints, to say nothing of scars, sores, rheumatism, and arthritis that would plague them. Their muscles were strong and wiry, especially on their arms, thighs, calves, and back. Unlike today’s bodybuilders, who have large sculptured muscles, the porters’ muscles were smaller but firmer. Poor nutrition on the roads (only salted vegetables and dry buns) may not have led to severe cases of scurvy, but they were likely to lose some of their teeth, and whatever remained would take on yellow strains. They were relatively short and stout. They cut their hair short, if possible, for convenience and to avoid sweat and fleas. Sweat and dust from long hours of outdoor work gave them a body odour different from that of the upper-class scholar-artists who liked to surround themselves with all sorts of burning aromatic substances. A lack of education meant that they were mostly illiterate. They probably spoke only their own topolects, which were difficult for outsiders to understand. They thus tended to aggregate in communities of people from their area when they travelled to larger towns. They were accustomed to using their muscles, but unlike the scholar-artists who were trained in writing and fine crafts from childhood, they would have lacked fine motor skills.

Even though they were closely connected to the commodities linked to the leisure activities of the scholar-artists, the porters had brutish and difficult lives. In their physical appearance, odour, and languages, the porters seemed to be at odds with the urban setting with which, by dint of their means of livelihood, they came into contact from time to time. However, the economic value they helped create was significant because only they could bring precious and rare raw materials out of the mountains. Although they might not appear in the textual records of the scholar-artists, their participation in the production and exchange networks of the tea, aromatic substances, and raw materials for making the *qin* should not be forgotten.

1. ZLCH, vol. 1: 104. [↑](#footnote-ref-2)
2. Fujian Sheng Quanzhou Haiwai Jiaotongshi Bowuguan ed. 1987: 4-5, 64-7. [↑](#footnote-ref-3)
3. Xu Guimei and Chen Quanbin 2009; Zhu Cunfang 2012: 4-5; Zhang Xiaochun 2015. [↑](#footnote-ref-4)
4. Huang Xiaoyun et al. 2021: 94. [↑](#footnote-ref-5)
5. “Yangu huaxiang.” Personal communication with a tea farmer, December 2018. [↑](#footnote-ref-6)
6. Huang Xiaoyun et al. 2021. [↑](#footnote-ref-7)
7. Personal communication, December 2018. [↑](#footnote-ref-8)
8. SHYJG 6:135.5308 (*juan* 5782). *Longyun ji* 28.303. Qi Xia 1988, vol. 2: 747. These names, *Rizhu*, *Hongzhou Shuangjing*, and *Mengding* mentioned in these texts seem to be specific brand names of the tea, which were based on the names of places where these teas came from. [↑](#footnote-ref-9)
9. Paul Smith 1991: 13-76. [↑](#footnote-ref-10)
10. SS 13:184.4510. [↑](#footnote-ref-11)
11. A *catty*, or *jin* in Chinese, is a traditional unit of measurement used in the Sinosphere roughly equal to 600 metric grams. [↑](#footnote-ref-12)
12. Qi Xia, 1988, vol. 2: 746. See also Paul Smith 1991: 219. [↑](#footnote-ref-13)
13. A *tael*, or *liang* in Chinese, *is* equal to th of a *catty*, which converts to around 35–40 grams. [↑](#footnote-ref-14)
14. SS 13:184.4509.  [↑](#footnote-ref-16)
15. Their suggestions echo ideas stated in the *Dongxi shichalu*. ZLCH, vol. 1: 86. [↑](#footnote-ref-17)
16. ZLCH, vol. 1: 104. [↑](#footnote-ref-18)
17. ZLCH, vol. 1: 90. [↑](#footnote-ref-19)
18. ZLCH, vol. 1:135-6. [↑](#footnote-ref-20)
19. ZLCH, vol. 1: 104. [↑](#footnote-ref-21)
20. Xu Chujiang et al. 1985: 11. Lu Yongxiang et al. eds. 2004: 33-4. [↑](#footnote-ref-22)
21. *Leigong paozhilun* 2.81. [↑](#footnote-ref-23)
22. *Leigong paozhilun* 2.81. [↑](#footnote-ref-24)
23. Today’s pharmacists certainly disagree with some of the beliefs. [↑](#footnote-ref-25)
24. *Leigong paozhilun* 2.75-6. [↑](#footnote-ref-26)
25. *Leigong paozhilun* 2.58. [↑](#footnote-ref-27)
26. *Leigong paozhilun* 2.23-96; 3.124-35. [↑](#footnote-ref-28)
27. ZLCH, vol. 1: 104. [↑](#footnote-ref-29)
28. *Leigong paozhilun* 2.23-96. [↑](#footnote-ref-30)
29. *Leigong paozhilun* 2.75-6. [↑](#footnote-ref-31)
30. *Leigong paozhilun* 2.42. [↑](#footnote-ref-32)
31. *Leigong paozhilun* 2.48. [↑](#footnote-ref-33)
32. *Leigong paozhilun* 2.48. [↑](#footnote-ref-34)
33. WXTK 1:18.174. [↑](#footnote-ref-35)
34. Wax-surfaced tea literally means that the surface of these tea cakes was waxed. It may also denote that this type of tea could produce wax-like foam when prepared by the tea-tipping method. It was an alternate name of a type of tea cakes from Fujian. See Takahashi 1994: 333; Liu Shufen 2004: 118-9. [↑](#footnote-ref-36)
35. Lu Yongxiang et al. eds. 2004: 9-10. [↑](#footnote-ref-37)
36. There are many famous tea types and brands in Fujian, such as the *Dahongpao* of the *wulongcha* type and *Zhengshan xiaozhong* of the red tea type. [↑](#footnote-ref-38)
37. SHYJG 6:136.5348 (*juan* 5785). [↑](#footnote-ref-39)
38. *Jingde ji* 1.11, 9-15. [↑](#footnote-ref-40)
39. *Jingde ji* 1.11, 9-15. See also Qi Xia, 1988, vol. 2: 756. [↑](#footnote-ref-41)
40. See also Robbins 1974. [↑](#footnote-ref-42)
41. Tao Dechen 1998: 239. [↑](#footnote-ref-43)
42. Robbins 1974. James Benn 2015: 66-8, 81-4. [↑](#footnote-ref-44)
43. ZLCH, vol. 1:83-5, 103. [↑](#footnote-ref-45)
44. ZLCH, vol. 1: 76, 79, 116. SHYJG 6:136.5327. [↑](#footnote-ref-46)
45. Qi Xia, 1988, vol. 2: 749-59. [↑](#footnote-ref-47)
46. SS 13:183.4477 to 184.4511. Qi Xia 1988, vol. 2: 745-804. [↑](#footnote-ref-48)
47. See Adam Smith 1952[1776]: 194, “invisible hand” in Chapter II, “Of Restraints upon the Importation from Foreign Countries of such Goods as can be produced at Home,” in Book Four. Marx 1975[1844]; 1977[1867]. Keynes 1973[1936]. Hazlitt ed. 1960. [↑](#footnote-ref-49)
48. SS 13:183.4479. SHYJG 6:136.5321-3 (*juan* 17560), 6:136.5324 (*juan* 5784). WXTK 1:18.174-5. MXBT 11.71. [↑](#footnote-ref-50)
49. SHYJG 6:136.5324 (*juan* 5784). Chaffee 2006: 31-77. [↑](#footnote-ref-51)
50. WXTK 1:18.173. Qi Xia, 1988, vol. 2: 759-60. [↑](#footnote-ref-52)
51. SS 13 :183.4478. WXTK 1:18.175. MXBT 11.71. [↑](#footnote-ref-53)
52. SS 13:183.4479. [↑](#footnote-ref-54)
53. Qi Xia1988, vol. 2: 769. [↑](#footnote-ref-56)
54. Numerous tax reforms that were branded with various names gradually emerged. See WXTK 1:18.173-7; MXBT 11.71. See also the debates recorded in Wang Anshi’s essay in *Linchuan Xiansheng wenji* 70.743; Ouyang Xiu’s essay in *Ouyang Wenzhonggong wenji* 112.861-2. Qi Xia1988, vol. 2: 775-94. Huang Chunyan 2002: 4-11. [↑](#footnote-ref-57)
55. Qi Xia 1988, vol. 2: 801, no table no. [↑](#footnote-ref-58)
56. The expenditure of Huizong’s public projects and private entertainment was huge, see Ebrey 2014: 278-83. But he and his government would need to have such savings to cover the expenditure. [↑](#footnote-ref-59)
57. Marx 1977[1867], vol. 1: 926. [↑](#footnote-ref-60)
58. SS 13:183.4478-9. See also WXTK 1:18.174-7. [↑](#footnote-ref-61)
59. Qi Xia 1988, vol. 2: 763-4. [↑](#footnote-ref-62)
60. *Jingde ji* 1.13. [↑](#footnote-ref-63)
61. *Liangxi ji* 63.1002. [↑](#footnote-ref-64)
62. Ebrey 2014: 91-2, 425. [↑](#footnote-ref-65)
63. Ebrey 2014: 89-90. [↑](#footnote-ref-66)
64. SS 13:179.4360-1. [↑](#footnote-ref-67)
65. Ebrey 2014: 507-9. WXTK 1:18.174-5. [↑](#footnote-ref-68)
66. See Ebrey 2014: 507. See also Huang Chunyan 2002: 7, 118-9. [↑](#footnote-ref-69)
67. SS 13:184.4502-3. [↑](#footnote-ref-70)
68. SS 13:184.4502-3. WXTK 1:18.176. [↑](#footnote-ref-71)
69. SS 13:184.4502-3. [↑](#footnote-ref-73)
70. Samuelson and Nordhaus 2010[1948]: 176-7, 390-1, 675. [↑](#footnote-ref-74)
71. SS 13:183.4477. WXTK 1:18.173-4. [↑](#footnote-ref-75)
72. WXTK 1:18.174. [↑](#footnote-ref-76)
73. WXTK 1:18.174. See also Qi Xia 1988, vol. 2: 762. [↑](#footnote-ref-77)
74. ZLCH, vol. 1: 114-27. [↑](#footnote-ref-78)
75. See Xiong Fan’s *Xuanhe Beiyuan gongcha lu* in ZLCH, vol. 1: 116. [↑](#footnote-ref-79)
76. WXTK 1:18.175-7. SHYJG 4:84.3297-3332 (*juan* 11683-*juan* 11684). Cheng Guangyu 1988b. Paul Smith 1991. Jiang Tianjian 1991: 33-4. [↑](#footnote-ref-80)
77. Zhu Chongsheng 1985: 72-3; Cheng Guangyu 1988b; Jiang Tianjian 1991; Paul Smith 1991, especially pp. 249-84. See also Dai Yingcong 2009: 57, 185. [↑](#footnote-ref-81)
78. SHYJG 4:84.3300, 3303 (*juan* 11683). Mair and Hoh 2009: 73-6. [↑](#footnote-ref-82)
79. SS 13:184.4511. WXTK 1:18.175-7. See also Cheng Guangyu 1988b; Paul Smith 1991: 28-31. [↑](#footnote-ref-83)
80. WXTK 1:18.177. Mair and Hoh 2009: 73-6; Ebrey 2014: 376. See also Paul Smith 1991: 249-84 [↑](#footnote-ref-85)
81. SHYJG 4:84.3301 (*juan* 11683). [↑](#footnote-ref-86)
82. SHYJG 4:84.3323 (*juan* 11683). Jiang Tianjian 1991: 45. [↑](#footnote-ref-87)
83. Metal utensils were rare, but did exist, such as the Tang dynasty tea-powder crusher found in the basement of the Temple of Dharma Doors. Shaanxi Sheng Kaogu Yanjiuyuan et al. 2007, vol. 1: 131, vol. 2, color pls. 72-8, 80-1. [↑](#footnote-ref-88)
84. Wood 1999: 148-57. [↑](#footnote-ref-89)
85. Wood 1999: 145-55. [↑](#footnote-ref-90)
86. We do not yet know the origins of the dragon kilns, but for some examples, see Xiong Haitang 1995: 81-95; Wang Yifeng 2010: 26-80. Wang Yifeng translated *longyao* to “climbing kiln.” [↑](#footnote-ref-91)
87. Xiong Haitang 1995: 21-42; 68-74. [↑](#footnote-ref-92)
88. Xiong Haitang 1995: 23-32; 38- 42; 81-95. [↑](#footnote-ref-93)
89. Personal communication with the potters; see also Xiong Haitang 1995: 26, 51, especially pp. 196-9. [↑](#footnote-ref-94)
90. Xiong Haitang 1995: 23-32; 38- 42; 91-5. [↑](#footnote-ref-95)
91. Fujian Sheng Bowuguan 2000: 22, 27, 30, 45-6. [↑](#footnote-ref-96)
92. SS 13:186.4539. [↑](#footnote-ref-97)
93. *Tianxiang zhuan*, 36-9. [↑](#footnote-ref-98)
94. Liu Jingmin 2004: 150. [↑](#footnote-ref-99)
95. *Tianxiang zhuan*, 38. “Environmentally friendly” and “ecological balance” are my own terms to interpret the original phrases. The meanings of the Chinese and English phrases do not exactly correspond, but the connotations are highly similar. [↑](#footnote-ref-100)
96. *Tianxiang zhuan*, 38. [↑](#footnote-ref-101)
97. *Tianxiang zhuan*, 36, 38. [↑](#footnote-ref-103)
98. SS 13:186.4539. Fujian Sheng Quanzhou Haiwai Jiaotongshi Bowuguan ed. 1987: 64-7. Wang Huifang 1987. [↑](#footnote-ref-104)
99. SS 13:186.4539. [↑](#footnote-ref-105)
100. For example, see the *chenxiang* entry in *Leigong paozhilun* 2.79. See also ZLBC 12.362-7; and THHF 10.184. [↑](#footnote-ref-106)
101. *Gaozhai manlu*, 320. [↑](#footnote-ref-107)
102. Qi Xia1988, vol. 2: 906. [↑](#footnote-ref-108)
103. *Zhufan zhi* 2.29-34, 2.39-44. [↑](#footnote-ref-109)
104. *Youhuan jiwen* 7.61. *Zhufan zhi* 2.39. [↑](#footnote-ref-110)
105. Alum could be used to purify water and thus became highly desired goods. [↑](#footnote-ref-111)
106. SS 13:186.4538-9. *Tianxiang zhuan*, 36. [↑](#footnote-ref-112)
107. SS 13:186.4538-9. SHYJG 6:136.5323 (*juan* 17560). [↑](#footnote-ref-113)
108. SS 13:185.4537. [↑](#footnote-ref-114)
109. Qi Xia1988, vol. 2: 911, based on SHYJG 6:147.5761-2 (*juan* 14989) [↑](#footnote-ref-115)
110. SS 13:186.4539. [↑](#footnote-ref-116)
111. For the studies of artisans, see Barbieri-Low 2007; Ko 2017. [↑](#footnote-ref-117)
112. Han Baoqiang 2003: 18, 90, 176; Sui Yu 2010: 29-30. [↑](#footnote-ref-118)
113. We have to note that both the Chinese names and English-translated names of the timbers do not correspond to the same species in modern scientific terms. The Chinese parasol tree is different from the paulownia trees (*paotong*). Cunninghamia is a type of cypress, not fir. [↑](#footnote-ref-119)
114. Zhao Renjie and Yu Yunshui 2003: 322-9, see also pp. 94-130, 135-45. [↑](#footnote-ref-120)
115. Zhang Fugang 1990: 32; Zhao Renjie and Yu Yunshui 2003: 150; He Zhiling 2013: 61-3. [↑](#footnote-ref-121)
116. Zhang Fugang 1990: 32-4; Han Baoqiang 2003: 18, 90, 176; Sui Yu 2010: 29-30. [↑](#footnote-ref-122)
117. *Canluan lu*; see also Zhang Cong Ellen 2011: 64-8. [↑](#footnote-ref-123)
118. *Canluan lu*, 4. [↑](#footnote-ref-124)
119. *Soushenji* 13.167. [↑](#footnote-ref-125)
120. *Shangshu gushi* 1.4. [↑](#footnote-ref-127)
121. *Dongtian qinglu ji*, 225-6. [↑](#footnote-ref-128)
122. Yan Xiaoxing 2019. [↑](#footnote-ref-129)
123. ZLBC 10.398. [↑](#footnote-ref-130)
124. MXBT 1:5.36. [↑](#footnote-ref-131)
125. Huizong was also famous for his *Wanqintang* (Hall of tens of thousands of *qin*) collection, as recorded in *Yunyan guoyan lu* 2.61. In other versions it is recorded as *Baiqintang* (Hall of hundreds of *qin*). [↑](#footnote-ref-132)
126. *Yunyan guoyan lu* 2.61. See also Zheng Minzhong 1993: 6. [↑](#footnote-ref-133)
127. Shandong Sheng Bowuguan 1972: 28. See also Zheng Minzhong 1993: 7. [↑](#footnote-ref-134)
128. Lu Changchao 2009: 10-1. [↑](#footnote-ref-136)
129. Zhao Xihu also mentioned how the *qin* lovers preferred burying their *qin* under ground. *Dongtian qinglu ji*, 231. [↑](#footnote-ref-137)
130. Zheng Minzhong 1999: 35; Zhu Huipeng 2012: 128-59; He Zhiling 2013: 63. [↑](#footnote-ref-138)
131. Ma Xiao-ming et al. 2012. [↑](#footnote-ref-139)
132. Lu Rong et al. 2013: 157-8, 169-70. Terada 1999: 200-11. [↑](#footnote-ref-140)
133. *Seng Juyue qinzhi*, 651-2. See also Zhang Huaying 2013: 306-8. [↑](#footnote-ref-141)
134. *Seng Juyue qinzhi*, 650; *Dongtian qinglu ji*, 223. [↑](#footnote-ref-142)
135. Zhu Huipeng 2012: 128-59; He Zhiling 2013: 63; [↑](#footnote-ref-143)
136. *Seng Juyue zaoxianfa*, 8. [↑](#footnote-ref-144)
137. Yang Yuanzheng 2015a. [↑](#footnote-ref-145)
138. QSW35:741.147. [↑](#footnote-ref-146)
139. Egan 1984: 36; 221-2. [↑](#footnote-ref-147)
140. Zheng Minzhong 1989: 21; 2001 (shang): 36. Li Mingzhong 2000a: 96; 2000b: 28. Lu Changchao 2009: 10-11. Sui Yu 2010: 13-40. Zhu Huipeng 2012: 128-59. Zhang Huaying 2013: 306-8. He Zhiling 2013: 63. [↑](#footnote-ref-148)
141. *Biluozi zhuoqinfa* in the QYYL, 111-21. *Qinshu* in QYYL, 64-107. *Seng Juyue qinzhi*, 650-1. See also Sui Yu 2010: 16. [↑](#footnote-ref-149)
142. See Sui Yu 2010: 13, table 4; p. 20, table 8. But Yang Yuanzheng thinks that there are only three *qin* extant that can date to between 750 and 1000. Yang Yuanzheng 2020: 82. [↑](#footnote-ref-150)
143. Yang Yuanzheng 2020: 72. Lu Changchao 2009: 10-1; Zhu Huipeng 2012: 128-59; He Zhiling 2013: 63. [↑](#footnote-ref-151)
144. QYYL, 111-4. [↑](#footnote-ref-152)
145. QYYL, 114-6. [↑](#footnote-ref-153)
146. Zheng Minzhong 1989: 21. [↑](#footnote-ref-154)
147. Lu Changchao 2009: 10-1; Zhu Huipeng 2012: 128-59; He Zhiling 2013: 63. [↑](#footnote-ref-155)
148. *Seng Juyue qinzhi*, 651. [↑](#footnote-ref-156)
149. Ihara 1991: 39-40. [↑](#footnote-ref-157)
150. Mair and Hoh 2009: 124-36. Da-Qiongpei 2017: 26-54. See also Kim 2020.

     Cheng Guangyu 1988b: 112-4. [↑](#footnote-ref-158)
151. Wang Fuxin 2007: 306-20; Zhang Cong Ellen 2011: 43-68, 88-100. [↑](#footnote-ref-159)
152. *Guixin zashi*, *xuji* 1.157. *Dongjing menghua lu* 3.139-40. See also Mair and Hoh 2009: 147; the Russian, Mongolian, and northern Chinese used camels and ox-carts to carry tea to Kyakhta, then to St. Petersburg and Moscow in the nineteenth century. [↑](#footnote-ref-160)
153. *Dongjing menghua lu* 4.143. [↑](#footnote-ref-161)
154. See Shen Zuxiang 2002: 103-10; Wang Fuxin 2007: 232-76. [↑](#footnote-ref-162)
155. *Cf*. Kim 2020: 271-328, 452-82. [↑](#footnote-ref-163)
156. *Canluan lu* 1-17. [↑](#footnote-ref-164)
157. *Canluan lu* 11, 13-4. [↑](#footnote-ref-165)
158. *Canluan lu* 11, 13-4. [↑](#footnote-ref-166)
159. Zhang Ellen Cong 2011: 7. [↑](#footnote-ref-168)
160. *Dongjing menghualu* 4.143-5; Ihara 1991: 188-192; 225-6. [↑](#footnote-ref-169)
161. Ihara 1991: 44-6. [↑](#footnote-ref-170)
162. See also Shen Zuxiang 2002: 103-10; Zhang Ellen Cong 2011: 100-10. [↑](#footnote-ref-171)
163. *Guixin zashi*, *xuji* 1.157. [↑](#footnote-ref-172)
164. ZLCH, vol. 1: 107. [↑](#footnote-ref-173)
165. See the nineteenth to twentieth century tea laborers in Ceylon, Mair and Hoh 2009: 216 (photo in George Grantham Bain Collection/Library of Congress, Washington, D.C.); 223 (photo in The Art Archive), and the early twentieth century tea porters transporting tea on dangerous roads in Sichuan at 5,000 feet above sea level, Kim 2020: 323, fig. 7.20 (photo taken by Ernest Wilson in 1908, collection of the Arnold Arboretum Library, Harvard). See also Dai Yingcong 2009: 185. [↑](#footnote-ref-174)