



RESEARCH PAPER

Sandalwood and Human Beings: A Perspective of Environmental History

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ABSTRACT

This study is to examine the interaction between humans and sandalwood from the perspective of environmental history. Sandalwood was originally an ordinary plant in nature, growing naturally. When it was discovered and used by human beings, sandalwood was brought into the world of human history. In the long history of human interaction with sandalwood, it has been placed on the consumption end, trade end, and production end, and has formed a good or bad relationship between man and nature. Based on historical documents, records and previous research results, this study uses the method of document analysis to explain the interactive relationship between human and sandalwood, so as to reveal the relationship between man and nature. We found that, the interaction between people and sandalwood has roughly gone through the stages of “the natural consumption of satisfying life”, “excessive consumption of chasing profit”, “protective consumption of promoting sustainable development”. It is also revealed that human beings constantly reflect on themselves and actively seek the sustainable way to live in harmony with nature.

KEYWORDS Consumption, Environmental History, Human Beings, Sandalwood, Sustainable Development

Introduction

It is a history of thousands of years for understanding and utilization of sandalwood by human (Kumar, Joshi & Ram, 2012). There are corresponding records in the civilizations and classics of ancient Egypt, ancient India (Sandeep & Manohara, 2022, Venugopalan, Tabassum & Shilpa, 2022), and ancient China (Wen, 2014, Cheng, 2018). Sandalwood is widely used in medicine, preservatives, fuel, worship of gods, and royal products. Since the Age of Navigation in about the 15th century, in order to meet their own needs for spices and oriental items, the early European powers embarked on a world-class spices hunt and promoted the sandalwood trade for four centuries, resulting in a large amount of wild sandalwood being excessive deforestation and sold, causing species and environmental problems. After entering the 20th century, human beings are also exploring the technology and knowledge of artificial cultivation of sandalwood trees, in order to increase the production of sandalwood to meet the demand. It is that the history of sandalwood and human beings is very long. During this long history, the relationship between sandalwood and humans has also undergone severe ordeal. From human and wild sandalwood in early time to humans' research, summarization and utilization of the natural habits of sandalwood in modern times, and attempting to carry out sandalwood planting experiments and sandalwood plantation promotion, the relationship between human and nature reflected by the two has become important topic in environmental history. This paper examines the changes in the relationship between human and sandalwood from the perspective of environmental history, and advocates the way of harmonious coexistence between human and nature.

Literature Review

Environmental history is a branch of discipline developed in the middle of 20th century. It was born out of human's concern about environmental problems since the Industrial Revolution, and it is a subject that cares about social reality. The research field of environmental history is quite extensive, and its essence is the relationship between man and nature. As climate change becomes more and more serious, the relationship between people and plants, especially between people and forests (trees), is highlighted. Historians use their expertise to tease out the relationship between human and forests (trees) from historical documents and materials. There have been many research achievements in this field. Sultan-i-Rome(2016) detailed how forests have been managed in Swat State areas and Kalam from 16th century to 2014, and how about the relations between people and land & forests in this area. Historian Zhang Meng(2021) argued that people made new economic arrangement, namely developing renewable wood resources, while cutting down virgin forest. The Qing state(China) managers took advantage of new property rights system and economic incentives, persuading landowners invest on planting trees in order to satisfy the sustainable supply of lumber. This is a new case for the study of Chinese environmental history. Du Xiangyu(2020) show her view that "the large-scale introduction and development of rubbers was the product of cross-culture and ecological expansion in special periods, which caused the consequence of environmental degradation". Wang Linya(2022) discussed that "the process of European exploration, cognition and transplanted of cinchona is a transnational flow of knowledge about cinchona's planting ecology, and it has reshaped the ecological structure of South America and Southeast Asia". All these fruits are about the relationship between human and trees or forests from the perspective of environmental history, but it is few that the research on sandalwood in this aspect. I only find an article by Ezra D. Rashkow(2014). He argues that "at least when mentioning Indian sandalwood, European foresters did overexploit the species and also failed to conserve it, but the real watershed moment for the species came not during the colonial period but in the independence period when industrialisation led to a major endangerment crisis for sandalwood tree." As a rare tree species, the relationship between sandalwood and human beings is a significant research topic. Therefore, the main task of this study is to investigate the interaction between human beings and sandalwood from the perspective of environmental history over a long period of time.

Material and Methods

This study mainly uses the methods of historical narration and environmental history analysis, and discusses the interaction between human and sandalwood under the theoretical framework of environmental history which was established by the famous American environmental historian J. Donald Hughes(2006). He argued that environmental history has three major themes, namely, the role of nature in human history, the impact of human production and life on nature and the changes in humans' concepts. Through the narration of interaction between human and sandalwood in production, consumption and trade, it reveals the role of sandalwood in human history and life, the influence of human production and life on sandalwood, and the change of human's concept on cognition, utilization and protection of sandalwood. Through these historical narratives and environmental history analysis, it is discussed the interaction between human beings and sandalwood in the long period of history.

Historical Narrative of the Interaction between Human and Sandalwood

It has experienced a long history that the discovery, understanding, utilization and protection of sandalwood. This part is a historical narrative about the interaction between human beings and sandalwood based on historical data, which can be roughly summarized as the interaction between them at the production end, the consumption end and the trade end.

Production and Distribution of Sandalwood

The deeds of the discovery of the first sandalwood by humans have been unproven. According to our knowledge of the natural habit and growth environment of sandalwood today, sandalwood is mainly distributed in tropical and subtropical regions, roughly ranging from the eastern end of Java Island in Indonesia (E110°) along both sides of the equator to Juan Fernandez Island in Chile (W78°50'), north to Ogasawara Island (N28°), and south to Victoria, Australia (S35°). In this vast area, there are roughly 16 species and 15 varieties sandalwood trees recognized by most scholars in the botanical field (Li, 2003). The 16 species refer to Indian sandalwood (*S.album*), New Caledonian sandalwood (*S.austrocaledonicum*), Fiji sandalwood (*S.yasi*), Papua sandalwood (*S.macgregorii*), Ogasawara Sandalwood (*S.boninense*), Tahitian Sandalwood (*S.insulare*), Chilean Sandalwood (*S.fernandezianum*), Australian sandalwood (*S.lanceolatum*, *S.obtusifolium*, *S.acuminatum*, *S.murrayanum*, *S.spicatum*), Hawaiian Sandalwood (*S.paniculatum*, *S.ellipticum*, *S.freycinetianum*, *S.haleakalae*). Due to the diversity in the natural and geographical environment of their growth, different species have differences in botanical characteristics, so their appellations are mostly named after their growing places. Therefore, the main producing areas of sandalwood are in southern India, northern and western Australia, Sri Lanka, Myanmar, Malaysia, Timor Island, Hawaii, South Pacific island countries and so on. This article refers to these areas as the production end of sandalwood. The condition of natural environment in the production end affects the planting and production of sandalwood.

In today's intellectual circles, though there is some controversy, it is generally believed that Timor Island and the South Pacific Islands are the native places of sandalwood, and other areas are constantly becoming new sandalwood producing areas due to the dissemination of sandalwood seeds or artificial introduction (Fischer, 1928). The distribution of sandalwood in the world is extremely limited. Since the 20th century, human beings have explored the knowledge and technology of artificially planting sandalwood. It was not until around the 21st century that large-scale artificially planted sandalwood plantations were formed in Australia, southern China, Malaysia and India. The efforts are made to make up for the lack of wild sandalwood with artificial cultivation. Compared with the natural growth of wild sandalwood, the growth conditions of artificially cared sandalwood plantations are far superior to their wild environment, and the time to maturity is also greatly shortened to about 7-15 years in Malaysia and Australia. The relationship between sandalwood and human beings has developed from the simple use of sandalwood to the understanding, cultivation and utilization of sandalwood by human beings. Among them, the reflected relationship between man and nature has also developed from human conquest of nature to human understanding of nature, utilization of nature and promotion of harmonious coexistence between the two. This is also the attitude that human beings should have to get along with nature as advocated by environmental history.

Consumption on Sandalwood

Different ethnic groups and societies have different emphasis on the consumption of sandalwood, but they recognize the special properties of sandalwood as a substance, that is, fragrance and firmness. This material property extends to various fields, opening the consumption end of sandalwood in human society. The consumer end here refers to various fields in which human beings apply sandalwood and its various products in order to exert the value and function of sandalwood.

Forests provide a reliable guarantee and material source for human survival and development. Sandalwood is no exception. As a member of the forest family, sandalwood has provided human beings with rich material forms in history, such as sandal wood, sandal powder, sandal oil and various products made from this raw material. Sandalwood appears in human consumption in various forms. The ancient Egyptians imported sandalwood for use in royal medicine, embalming, and burning ceremonies for the worship of gods (Burdock

& Carabin, 2008); the records in ancient Indian *Vamana Purana* show that incense wood was recommended for worshipping Lord Shiva, The *Brahma Vaivarta Purana* records that the goddess Lakshmi lived on the sandalwood tree (Sensarma, 1989), and the Indian ancestors limited the application of sandalwood and its products to Brahmins, Kshatriyas and other high castes, Mysore kingdom in India even named the sandalwood tree as the Royal Tree in 18th century. It is also the cremation fuel for Indian royal relatives, high officials and dignitaries, as well as religious and rich people. It was top grade sandalwood that used as fuel at the funeral of Gandhi, the founding father of India. Sandalwood is also one of the incense raw materials for Hinduism, Buddhism, Islam and other religions. Sandalwood was introduced to China along with Buddhism in the Eastern Han Dynasty and became an important material product loved and used by Buddhism, Taoism and ancient Chinese royal families, such as in major Buddhist monasteries, Palace pavilions, sandalwood is widely used as construction and decorative materials, so it is named "*Tan Si*", "*Tan Lin*", "*Tanxiang Ge*", etc.. The incense used in temples and various Buddhist supplies are mostly made of sandalwood (Cheng, 2018). Sandalwood is also used in manufacture of most of the imperial seals and their furniture products in the palace. Sandalwood sawdust and wood powder are also used as medicinal materials in traditional Chinese medicine. In addition, sandalwood is also the main raw material for various woodcarving crafts. Thailand, as a country founded on Buddhism, sandalwood is a commonly used spice in the royal family. For example, in the Royal Cremation of His Majesty King Bhumibol Adulyadej in October 2017, a lot of sandalwood was used (Chen, 2017), such as traditional sandalwood paper flowers, sandalwood fuel, sandalwood royal urn and 876 sandalwood pavilions erected around the Thailand (Hana, 2017), they believed that the fragrance of sandalwood led the souls of the deceased to heaven; sandalwood is also an indispensable spice in the incense prescriptions used by the Japanese court. Basically, in the field of traditional consumption, India, China, Thailand and other Southeast Asian countries with a predominantly Buddhist belief are the bulk consumer markets for sandalwood and its products.

Around 1900s, people distilled the oil from the heartwood of sandalwood. The oil was used in a range of products including medicinal, cosmetic, skin care, aroma therapy and fragrances, and these products became a consumer area dominated by Western culture. There are many of the most prestigious and time-honored perfumes are constructed around Indian sandalwood oil including iconic brands like Chanel, Guerlain, Dior, Lanvin, Jean Patou (Brown, Mettetal & Hettiarachchi, 2022). They are all using sandalwood essential oil as one of the materials, and these products have become the best fragrances for European royal family members and nobles from all over the world. Sandalwood essential oil has anti-inflammatory and anti-cancer effects due to its rich chemical components, and is used to make various anti-inflammatory drugs and skin cancer drugs.

So, whether from a cultural point of view or from a material point of view, sandalwood is widely consumed in fields such as religion, medicine, architecture, court, fragrance, aroma and sculpture in Eastern and Western societies. Natural things have been endowed with new values through the cultural creation of human beings. This value includes both the value of the material itself and the added symbolic value due to cultural assignments. As Daniel Miller said, things have two sides, symbolic and material (Daniel, 1987), because they are symbolic, they can be used by people, and because they are material, they can use people, that is, things can affect people. Sandalwood is a natural thing and comes from nature. The extensive consumption of sandalwood by humans reflects the utilization of nature by humans. The attitude, concept, and scale of human consumption of nature determine the degree of harmony between human and nature. Excessive consumption will lead to the revenge of nature, while moderate consumption is conducive to the harmonious coexistence of human and nature.

Trade of Sandalwood

Humans' material consumption and cultural consumption of sandalwood requires a large amount of sandalwood as a basis. However, in the historical and contemporary times, most of large-scale consumption areas for sandalwood mentioned above are not the original planting areas of sandalwood, which provides demand for sandalwood from its planting place to its consumption place, that is, the trade of sandalwood has become another end, the trade end.

When the trade records of sandalwood in human history began, it is difficult to verify exactly. However, we can still judge the trade route of sandalwood based on its limited cultivation environment and areas. Basically, before the great seafaring era in the 15th century, the communication of human beings in different regions mainly relied on land routes, and a few neighboring islands relied on their traditional water vehicles such as canoes to communicate with each other. Therefore, the transportation of sandalwood is mainly by land in early time. In the ancient Chinese classics, the earliest record of sandalwood is the record of folk trade in the classics of the *Han* Dynasty, that is, the "*Han·Yuefu·Guci*" says: "Where does the *Hu* people come from? What do the states' people bring here? *QushuTadeng*(麝香没药), five woods incense, rosemary wormwood and *Duliang*." Here the "five woods incense", after textual research, refers to "sandalwood, agarwood, clove fruit, ageratum, mastic"(Wen, 2016). *Yu Yiqi* of the Eastern *Jin* Dynasty said in his "Letter to *Han Yuzhang*": "Foreigners said, all incense is a wood, wood flower is clove fruit, wood glue is mastic, wood section is *Radix aristolochiae*, wood root is sandalwood, and wood leaf is ageratum, wood heart is agarwood"(Yan, 1999). It means that in the Later *Han* Dynasty, foreign merchants (*Hu*) had imported sandalwood as one of the five incense trade goods into ancient China. "*Tong Dian*" Volume 193 "Border Defence Nine • *XiRong* Five • Tenjiku" records: "(Tenjiku) The lion, mink, and leopard are from the state...There are also many things such as Candana and tulip, sugarcane fruits, jaggery, pepper, ginger, black salt. Trade for west to Cippus, Parthian Empire in the sea, or trade to *Funan*, Cochin"(Du, 1988). It shows that the sandalwood produced in Tenjiku (India) went west to Cippus (now Roman area) and Parthian Empire (now Iran area) and other places along with other spices to be transported to other areas of Asia, such as *Funan* (now Cambodia) and Cochin (now northern Vietnam) for trade. In Southeast Asia, around the 1st century AD, Southeast Asian economies represented by the Kingdom of *Funan* also continued to expand their trade. *Funan* merchants actively dealt in various aromatic medicines from the Mediterranean, the Middle East, India and Africa, and also promoted products produced in Southeast Asia, including camphor, agarwood, sandalwood and so on. Malay sailors used the Sunda Strait as their base to trade sandalwood and cloves in Java and other places. In the 2nd to 3rd centuries, the Little Sunda Islands, Moluku (also as Moluccas), Borneo, Java, Sumatra and other places gradually became active as commercial places. "*Song Yuanjia* Living Notes" records that "in fifth year, King *Yueai* of Tenjiku Pijiali sent an envoy to *Song*, and presented a diamond ring, a gold ring of Gangyin Mole, six pieces of white sandalwood, a white parrot and a red parrot and two thinly stacked."(Li, 1960) That is, in 428, the King *Yueai* of India presented tributes including six pieces of white sandalwood to Emperor *Wendi* of *Song* Dynasty. The Book of Southern *Qi*, Volume 58, "Biography of Southeastern *Yi*" records: "In the second year of *Yongming*, *Jyvrnm* sent Tenjiku *Shi Najiaxian* and stated that ... *Funan* King... presented a seated golden dragon king, a white sandalwood statue, two ivory towers, two pairs of ancient shells..."(Xiao, 1972). In 484, the King of *Funan* presented a white sandalwood statue to Emperor *Qi Wu* (this statue image is most likely Buddha statues, because there are also ivory towers that pay tribute at the same time). Sandalwood was presented as a tribute by envoys from Tenjiku, *Funan* and other countries to the Chinese emperor at that time. In the 7th to 11st centuries, the Sri Vijaya Kingdom also strongly joined and carried out trade in spices and silk with China, which promoted trade in the entire Southeast Asia and even Northeast Asia region (Kenneth, 1985). Arabs also took advantage of their business advantages to become middlemen in trade between Southeast Asia and Europe, India, China and other places, and changed hands to obtain profits. During this period, sandalwood, as one of many spices, was

traded by traders between different regions for profit, but most of the spices, especially sandalwood, flowed to China, and there were also envoys from neighboring countries sending sandalwood as one of the tributes which was dedicated to the Emperor of China. Through the investigation of the collected materials, it is impossible to judge that there was a relatively large-scale sandalwood trade or tribute during this period, but it was only one of the commodities or tribute.

The great geographical discovery after the 15th century promoted the free flow of global commodities, and the land trade routes controlled by Arab merchants in the past were gradually replaced by sea routes controlled by Westerners. By the end of the 16th century, sandalwood gradually became an important commodity in international trade (Guo, 2015). It was successively operated by Portuguese, Dutch, British and Americans, and was continuously shipped to China.

The Portuguese first monopolized the trade of sandalwood from Timor Island to China. They occupied the main strongholds on this trade route such as Macau, Malacca, Makassar, and Solor. By 1640, the Portuguese began to control the sandalwood trade on Timor Island, and shipped it to Macau and then transferred to mainland China (Charles, 1948). The proportion of sandalwood business in Macau's economy increased. Records show that at that time, about 1000~1500 bahars (one Bahar equivalent to 206 kilograms) of sandalwood were shipped from Timor to Macau every year (Wu, Tang & Jin, 2009). According to a memoir written by an anonymous Dominican, the trade of sandalwood in Timor in 1642 was between 276 and 368 tons (Sá, 1956, Sousa, 2008).

The Dutch coveted the Portuguese-dominated sandalwood trade, and Jan Pieterszoon Coen, the former governor of the Dutch Asia Trade Headquarters, wrote in a letter to the board of directors of the Dutch East India Company: "With sandalwood, we can force the Chinese to trade with us with their silk"; Dutch companies did whatever it takes to keep Timor Island, because they knew that the sandalwood harvested here is the most popular in China to exchange for Chinese goods (Fernand, 2002). Through this mode The Dutch easily used silver, pepper, sandalwood, etc. to join the Asian trade circulation system. In the 17th century, they established the Asian maritime trade network by means of transit trade, and accumulated a lot of wealth while competing with the Portuguese.

The addition of the British brought a new source of sandalwood to China. They took advantage of the East India Company's rule in India to discover the sandalwood produced in southern India, and developed the sandalwood trade from India to China. In December 1734, the "Richmond" under the British East India Company set off from London to Guangzhou, China, and arrived in Bombay, India in November 1735 and exchanged the British goods on board for Indian silver, cotton and other commodities, and went south to the port of Tellicherry in Kerala purchased 859 quintals of sandalwood and transported it to China. The total price of the whole ship in Guangzhou at that time was about 56,384 taels of silver, and the gross profit was 47%, while the profit of sandalwood accounted for 19.5% (Hosea, 1926). The British acted as sandalwood traders between India and China.

Around 1810, fur prices plummeted, and the trans-Pacific fur trade declined. Especially after the end of the war in Europe in 1815, American businessmen encountered competition from Britain and Russia in fur trade, as well as a huge drop in profits, and were in urgent need of new trade substitutes with China. Sandalwood in Hawaii has thus become an important commodity. Since 1815, the sandalwood trade has surpassed the fur trade (Zhou, 1999, James, 1992). At that time, merchants passing through Hawaii arranged at least one special ship to load sandalwood. In 1815, three Boston merchants jointly invested in the Marquesas Islands and the Hawaiian Islands to buy the best sandalwood and shipped it to China. By 1817, almost all Pacific traders knew the value of Hawaiian sandalwood and actively participated in this trade. The Hawaii sandalwood trade enjoyed a brief boom. After the crazy logging, there was not much sandalwood left on the island. In 1829, the former

sandalwood mountain had made “sandalwood a rare item here”. Since then, the sandalwood resources on the island of Hawaii have almost been exhausted. In 1839, Kamehameha III promulgated the first forest law in the history of the kingdom, prohibiting anyone from cutting sandalwood, and the Hawaiian sandalwood trade ended. The huge consumption capacity of sandalwood in the Chinese market made British and American merchants turn their attention to other Pacific islands. In 1811, American and British merchants transported 4,130 and 3,521 quintals of sandalwood from Fiji to Guangzhou respectively; in 1812, American merchants shipped sandalwood to Guangzhou 7350 quintals sandalwood (Hosea, 1991). Around 1818, sandalwood in the Marquesas Islands was depleted, and around 1830, sandalwood in the Fiji Islands was also depleted.

Since modern times, India and Australia have become the main supplier of the sandalwood market. In 1831, after Britain ruling in Mysore directly, the British Indian government strengthened the construction and management of forestry systems. By 1864, the development and disposal of sandalwood were under the jurisdiction of Forest Department. Sandalwood resources in the region have become an important composition of the British colonial economy. The British Indian government also plans to manage and market Mysore sandalwood resources. Sandalwood consumption has also expanded from Asia to Europe and the United States (Wu, 2021). Indian sandalwood trade has been included in the global trade system. As the records, the output of sandalwood in the Mysore and Madras regions is 3,000 tons per year, of which 2,000 tons were exported to Germany, 750 tons for local consumption, and 250 tons for other domestic consumption Mysore, Coimbatore, Coorg were the main sandalwood regions. Among them, the Mysore region occupied many favorable conditions for distilling sandalwood essential oil. In addition to the previous Sandalwood logs, the sandalwood oil was listed in the exported products. The sandalwood sold to China in the 19th century was mainly from India, and the Chinese called it “*Laoshan Tan*” (old mountain sandalwood). In 1844, when Western Australia settlers transported the first batch of about 4 tons of Western Australian sandalwood to Singapore in SS Champion ship, these woods became a global valuable product and were named “*Xinshan Tan*” (New mountain sandalwood), so it led to this industry and the price was US\$ 20 per ton at that time. After that, Australia became an important production place and export place for sandalwood products and was known by the world. In 1848, it exported 1335 tons of sandalwood wood, worth more than US\$ 26,000, accounting for 44% of the total exports of the place in the same period. When the Chinese market flooded too much sandalwood, the price fell, and the sandalwood trade in Western Australia was interrupted for 9 years, and it was restored in 1857. At that time, the export quota was 280 tons. In 1882, it exported 9,605 tons of sandalwood and worth US\$ 192,000; the total exports in 1920 reached 13,945 tons, worth US\$ 467,000.

The contemporary sandalwood market is supplied mainly by India, Australia and the Pacific Islands. Among them, India is subject to the national protection policy, and there are many restrictions on the export of sandalwood. In addition to the cumbersome approval process, the export of logs is prohibited. Only small pieces of sandalwood or scraps less than 50 grams are allowed to be exported, as well as such as Buddhist beads, Carvings, sandalwood products and essential oils. Australia’s export policy of sandalwood and its products is relatively loose; Pacific island countries are only allowed to export quantities that meet state regulation

A brief history of the sandalwood trade shows how sandalwood has grown from an ancient tribute and spice to a bulk commodity. The important turning point is marked by the beginning of the era of great voyages. It is divided into two stages: the first is represented by tribute or ordinary spices, and the latter is that sandalwood is regarded as a bulk international trade commodity. In the period when sandalwood was a large international trade commodity, the main traders and the conversion of sandalwood production areas just represented the status of sandalwood production. The profit drive of the sandalwood trade has led to the over-cutting and trade of sandalwood, a natural tree, and it has become one of

the endangered tree species. Sandalwood was first listed on the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species with a "Vulnerable" rating in 1994, and it is still on the list today (Arunkumar, Dhyani & Joshi, 2019).

Results: Analysis from Environmental History Perspective

Environmental history, according to J. Donald Hughes (2006), "is a history that attempts to understand the relationship between human beings and their natural environment as they live, work, and think over time." That is, environmental history pays special attention to the history of the relationship between human and nature, and considers this theme in the context of time change. The relationship between people and sandalwood has a long history. In this long-term historical process, examining the changes in the interaction between people and sandalwood is one of the main tasks of this paper.

Examining the production and distribution of sandalwood, the consumption of sandalwood, and the trade of sandalwood, we believe that the interaction between human beings and sandalwood has experienced "Natural Consumption of Satisfying Life", "Excessive Consumption of Chasing Profit" and "Protective Consumption of Promoting Sustainable Development".

Natural Consumption of Satisfying Life

The natural consumption of satisfying life is mainly in the initial stage of interaction between people and sandalwood, and the approximate time period is before the age of navigation, that is, before the 15th century. During this period, sandalwood was mainly used as one of the ceremonial articles between countries and common spices. For example, the tribute to the Central Dynasty of China contains sandalwood, the sandal incense is used by religions (Hinduism, Buddhism, Islam, etc.) in different regions of the world, different ethnic groups use sandalwood as national medicine, and people use sandalwood as one of many spices/fuels. The consumption of sandalwood in these fields is relatively limited, and most of them belong to life incense in different fields. In view of the limitations of manpower and transportation capacity, there is no special business group between the production and consumption ends of sandalwood to pursue huge profits, and the large-scale development of sandalwood does not seem to have formed. Therefore, it will not cause excessive felling of sandalwood trees. Nor do we find obvious environmental problems in this period in the historical records. Therefore, it is generally estimated that during this period, humans and sandalwood were basically in a symbiotic state, and humans did not cause excessive consumption of sandalwood.

Excessive Consumption of Chasing Profit

Since the era of great voyages, roughly from the 15th century to the middle of the 19th century, it was also overlapped the period of the industrial revolution in Europe. Developed countries urgently needed to expand the raw material market and commodity market, so they started the circumnavigation of "gold rush" and "seeking fragrance". Obviously, India and Southeast Asia are concerned as famous spice producing areas. Most of the people involved in these activities are businessmen and capitalists, and their purpose of coming here is very clear, that is, for profit. Therefore, driven by profits, several capitalist countries such as Portugal, the Netherlands, the United Kingdom, and the United States compete with each other for the control of sandalwood raw materials in this region, and compete with each other in the sandalwood consumer market dominated by China. Such as the competition between Portugal and the Netherlands on Timor Island and its surrounding areas, the British competition for sandalwood in South India, the US competition for sandalwood in Hawaii and the South Pacific region, and their cutting and acquisition of sandalwood in almost every area No leftovers left.

The coveted profits of the sandalwood trade led to Portuguese colonial rule in Timor for hundreds of years. They had only one interest in Timor, and that was sandalwood (An, 2012, p5). In a letter to Afonso de Albuquerque dated February 6, 1510, he wrote that "Melaka is a place of great wealth, where merchants from Gujarati, India, bulk sandalwood trade in quantities of 1,000 bahars (about 400,000 kilograms)" (An, 2012, p95). In 1642, under the auspices of the Dutch East India Company, Solo-born Captain Francisco Fernandez led a team to press the natives to surrender control of the sandalwood growing fields (An, 2012, p136-137). Netherlands and Portugal competed for sandalwood resources in the region. By the end of the 18th century and the beginning of the 19th century, Timor's sandalwood trade gradually declined as the resources were exhausted. Until the late 19th and early 20th centuries, after hundreds of years of deforestation, the sandalwood resources were exhausted, and then coffee was introduced to the area (An, 2012, p98-99). Excessive logging in Indonesia and Timor Island has made the region's sandalwood resources scarce.

After the British gained the dominion of India, in order to control the sandalwood resources in the south, it launched a war with the Kingdom of Mysore, and finally obtained the control of the sandalwood resources in the form of war, laying the foundation for the British sandalwood trade control in the 19th century. As the royal tree of the Kingdom of Mysore, sandalwood was completely reduced to a British colonial commodity (Wu, 2021). The first half of the 19th century saw a boom in the sandalwood trade in South India. In 1799, the total sales volume of Mysore sandalwood was more than 100 quintals, and in 1800, the sales volume was as high as tens of thousands and the total profit was 72%, and the profit rate was much higher than that of other commodities. Since then, the price of Mysore sandalwood has continued to climb, tripling in less than ten years, with an average overall profit margin of 83% (Indian office record, 1916). However, India's sandalwood resources were declared as state-owned property during the Kingdom of Mysore, and this state-owned policy has continued in India to this day. Many sandalwood trees have been cut down because of the sandal wood and oil trade (Ezra, 2022). Due to the lack of sandalwood resources in India, the British turned its attention to the Malay Archipelago, Fiji, and Marquesas Islands, which it occupied. However, given the limited resources here, the sandalwood in Marquesas Islands was almost completely harvested in 1818, and in 1830, sandalwood in the Fiji Islands was also depleted.

Hawaii's sandalwood reserves were abundant, and the value of sandalwood was recognized by the native king by chance. After that, by 1817, almost all Pacific traders knew about Hawaiian sandalwood and actively participated in this trade. The sandalwood resources of Hawaii brought a rich material life to the native chiefs, causing them to become extravagant and corrupt. At the same time, the sandalwoods in Hawaii were also wildly cut down in exchange for luxury goods. By 1829, the former Honolulu had made "sandalwood a rare item here". Since then, the sandalwood resources on the island of Hawaii have almost been exhausted.

The 400-year sandalwood trade has prompted the frenzied deforestation of sandalwood in pursuit of profit. The people involved are mainly local people, local leaders, and traders. Among them, local leaders and traders have obtained a lot of profits from the sale of sandalwood resources, and there are obvious profit drivers. The local people are ordinary laborers and do not benefit from it. The uncontrolled logging of local resources and the damage to the natural environment caused by this excessive profit-seeking behavior have caused misery to ordinary people and aroused protests. After all, relying on the unsustainable sandalwood trade method cannot continue the people's lives. However, during this period, actions such as the nationalization of sandalwood by the Kingdom of Mysore, the restriction of the harvesting rights of sandalwood by the Hawaiian royal family to the level of the royal family and the chieftain, and the forest management and research policies implemented by the British East India Company in India, etc., to a certain extent, opened the budding of the protective development of the sandalwood tree.

Protective Consumption of Promoting Sustainable Development

Since the middle of the 19th century, especially contemporary people have gradually realized the importance of preciousness and sustainability of sandalwood, and gradually developed protection awareness and actions. In 1831, after the British directly ruled Mysore, the British Indian government strengthened the construction and management of the forestry system. By 1864, the development and disposal of sandalwood were under the jurisdiction of the Forest Department. Sandalwood resources in this region have become an important part of the British colonial economy. The British Indian government also planned to manage and market Mysore sandalwood. Sandalwood consumption has also expanded from Asia to Europe and the United States(Wu, 2021). Indian sandalwood trade has been incorporated into the global trade system. Sandalwood in Australia first participated in international market transactions in 1844, bringing Australian sandalwood products into the world market, and mastered the refining technology of sandalwood oil in the early 20th century, and the Sandalwood Act was proposed by west Australia government in 1929. The Act stipulated that all sandalwood species grown in Western Australia were owned by the state, and all sandalwood exporters were managed and operated by one company(Australian Sandalwood Company, ASC). The annual harvest should be limited, and the harvesting and replanting of sandalwood trees should be strictly controlled in order to ensure the industry renewable and sustainable. ASC held Sandalwood in Western Australia until 1994. The Portuguese colonial government banned the logging of sandalwood in Indonesia and Timor in 1926 to protect the local sandalwood resources(An, 2012, p190-191). These actions, in fact, to some extent ease the uncontrolled felling of sandalwood.

The wild sandalwood species is endangered due to massive uncontrolled logging and trade, driven by high economic interests. In 1963, the governments of member states of the International Union for Conservation of Nature (IUCN) drafted the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and entered into force on July 1, 1975. It protects animal and plant resources, especially rare and endangered species, by monitoring the import, export and transportation restrictions of animals and plants internationally to prevent the extinction of animals and plants due to over-exploitation and utilization. Sandalwood species is listed among them and has become the object of protection in international trade. The implementation of the convention has imposed restrictions on the producers and importers of sandalwood in the world, thus greatly reducing the international trade of wild sandalwood. Sandalwood was first included in the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species with a "Vulnerable" rating in 1994, and it is still on the list today(Arunkumar, Dhyani & Joshi, 2019). Obviously, the sandalwood species is the protected object of the international list of endangered plant species, and the trade in sandalwood is bound to be bound by these regulations.

However, in order to meet the needs of human beings for sandalwood, on the one hand, to protect wild sandalwood species, on the other hand, human beings have also begun to explore the biological characteristics of sandalwood species and their artificial cultivation. During this period, with people's research and mastery of sandalwood planting technology, artificial cultivation and large-scale planting of sandalwood trees continued to appear. The research team in the Chinese scientific community, represented by the South China Botanical Garden of the Chinese Academy of Sciences, has been studying the botanical characteristics and planting of sandalwood since the 1960s. Up to now, they have mastered a lot of scientific knowledge about the growth and planting of sandalwood trees. Some areas of Guangdong, Fujian, Hainan, Guangxi, Yunnan have carried out trial planting and large-scale planting, which will make up for the demand for sandalwood in the Chinese society to a certain extent in the future. Australia, Malaysia, India and Cambodia in Southeast Asia have opened up artificially operated sandalwood plantations, of which Australia's Quintis Company as a represent, has become a global leader in sandalwood planting and the development of various sandalwood products. With the UN 2030 Agenda as the goal, the

Quintis is practicing sustainable development of enterprises, sandalwood and human beings.

Conclusion

The history of interaction between humans and sandalwood is a history of interaction between humans and nature. Sandalwood is known as the golden tree and the royal tree. It is a gift from nature to human beings. How to make good use of and protect this rare tree species tests the way people get along with nature. In the entire history of the interaction between human beings and nature, the way of getting along under the guidance of the concept of “human conquering nature” is only four or five hundred years old. The way of “non-action” between the two has occupied a long historical period, while the way of “conscious protection”, that is, sustainable development, is a matter of nearly 50 years. Engels warned in *“Dialectics of Nature”*, “Don’t be too intoxicated with our victories over nature. For every such victory, nature has avenged us”. This classic elaboration of the idea of “nature’s revenge” is a warning for the relationship between human and nature. Humans violate the law of natural ecological balance and blindly transform nature’s development mode in disregard of the value of nature, which will inevitably lead to consequences. Since the 1960s, academic reflection on past large-scale development and its impact has led to environmental history. It has been proposed to sort out the relationship between human and nature from a historical perspective. Donald J. Hughes, a famous American environmental historian, reminds us that by studying the changes of relationship between human beings and nature in different eras, to understand the history of human behavior and thought, always admonishing that “we ourselves are part of the environment”. The discovery, consumption, trade, research and development and cultivation of sandalwood just reflect the historical changes in the way of coexistence between the two, that is, from non-action to conquest to protection.

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