

Mobilizing Men and Women to Produce Taiwanese Tea

Douglas Fix* and Stephen Schick**

ABSTRACT

With reference to annual reports of the Customs, annual trade reports of the British consul, early investigations carried out by Japanese colonial officials, photographs and historical materials of various sources, this paper traces the evolution of the labor pool employed for second-stage tea processing by firms in Dadaocheng, Taiwan during the nineteenth century and the early Japanese colonial era. The size of this labor pool was estimated using specific data on tea-processing firms, annual tea export statistics, and firm-based employee figures. This paper also explores the gendered division of labor, working conditions for different tasks, and the brief historical data on wages for laborers involved in this second-stage processing of oolong and baozhong tea in northern Taiwan.

Keywords: Labor Conditions, Nineteenth Century, Taiwan, Tea Industry, Tea Labor

* Professor, History Department, Reed College

** Graduate, Political Science Department, Reed College

來稿日期：2020年12月25日；通過刊登：2021年4月6日。

1. Introduction
 2. Overview of Second-stage Tea Processing in Dadaocheng
 3. The Labor Pool for Processing Tea in Dadaocheng
 4. Estimating the Growth of the Second-stage Tea Processing Labor
 5. Wages: What Little We Know
 6. Mobilizing Labor to Process Tea in Dadaocheng
 7. Conclusions
-

1. Introduction

In late September 1871, American readers of *Frank Leslie's Illustrated Newspaper* were given their first visual impression of the tea processing industry in northern Taiwan with an engraving based on sketches Edward Greey had made in Formosa, when he was traveling throughout the island that year. By 1871, Formosan oolong tea was becoming familiar to American consumers who had access to tea imports in major United States cities. Thus, it was not unusual for Greey to include this sketch (Figure 1) of tea sorting in Tamsui with his other images of the island of Formosa:¹

This wood engraving may be the only visual image of the earliest years of tea processing in northern Taiwan. Perhaps afraid that viewers of the engraving would not comprehend the image, Greey added this textual description to guide them:

On the next page we give an illustration of the Method of preparing tea at Tam-sui for the American market. This work is generally done by boys and women, who are, in the picture, engaged in sorting the leaves preparatory to their being roasted. The central male figure in the doorway is the proprietor, A-low, who may further

¹ Greey's other sketches reproduced as wood engravings in this volume of the *Newspaper* include: Saracen's Head at the entrance to Takao harbor, the American consulate in Tamsui, carts transporting sugar cane, the port city of Kelung, and a newly reclaimed tea garden in northern Taiwan. Greey's travelogue was serialized in issues published from 2 September through 23 September 1871. See "Formosa: Nineteenth Century Images," accessed 15 July 2020; available from <https://rdc.reed.edu/c/formosa/home>.

be distinguished by his tight trousers and collared tunic. To his right is a native, who, unlike the Chinese, wears a sort of Malayan turban.²

While Greey gives credit to “women and boys” for their roles in processing the tea that American consumers were now drinking, both his visual and textual images of the industry focus on the merchants and the overseers who enabled this new and growing industry in Formosa. Historiography of the tea industry in nineteenth-century Taiwan shares that same tendency; few are the details regarding the men and women who processed the tea in Dadaocheng (Twatutia 大稻埕) for export.³ And for good reason. Most of the primary materials detailing tea production in the first four decades of the industry focus on exports, prices, tea merchants and their disparate mercantile practices, as well as the gains and losses of each tea season. Textured primary data on tea laborers is difficult to find, and substantive qualitative evidence appeared only when Japanese investigations were carried out after 1895.

In this paper, we hope to shed some light on this Formosa tea labor by analyzing the limited statistical and visual data that relate specifically to laborers employed in the second-stage processing of tea, primarily that conducted in Dadaocheng, in the nineteenth century (though important investigative evidence comes from the first decade of the Japanese colonial period, 1895-1905). In this first attempt to examine these materials, we hope to provide tentative answers to the following questions:

² Edward Greey, “‘Taiwan’: Formosa,” *Frank Leslie’s Illustrated Newspaper* (New York) 33: 384 (23 September 1871), p. 28.

³ Our knowledge of the historical scholarship on the nineteenth-century tea industry was culled from the following histories: Lin Man-houng, *Cha, tang, zhangnaoye yu Taiwan zhi shehui jingji bianqian, 1860-1895* [Tea, Sugar, and Camphor Industries and the Socioeconomic Development of Taiwan, 1860-1895] (Taipei: Lian Jing, 1997); Kawarabayashi Naoto, *Kindai Ajia to Taiwan: Taiwan chagyō no rekishiteki tenkai* [Modern Asia and Taiwan: The Historical Development of the Tea Industry in Taiwan] (Kyōto: Sekai Shisōsha, 2003); Hsu Hsien-yao, *Taiwan baozhongcha lunji* [Anthology of Articles Concerning Taiwan Baozhong Tea] (Taipei: Lexue Shuju, 2005); Liu Chih-yun, “Qing mo bei Taiwan chaye de maoyi (1865-1895) [Tea Trade in Northern Taiwan during the Late Qing Period (1865-1895)],” (Master’s Thesis, National Chi Nan University, 2006); Chiu Hsien-ming, “Rizhi shiqi Taiwan chaye gailiang zhi yanjiu [Research on the Improvement of the Tea Industry in Taiwan during the Japanese Colonial Period],” (Master’s Thesis, National Central University, 2004); Chen Chih-hao, Chen Guan-fei, and Chen Kai-wen, “107-nian weituo banli Yangmingshan Guojia Gongyuan Rizhi shidai chachanye diaocha yanjiu [Investigation and Research on the Tea Industry in Yangmingshan during the Japanese Occupation, Commissioned in 2018],” Yangmingshan Guojia Gongyuan Guanlichu weituo yanjiu baogao [Research report commissioned by the Yangmingshan National Park Management Office]. We thank Professor Chen Chih-hao for providing a copy of this recent source on the Yangming Shan tea industry during the Japanese period.



Figure 1 Day, “Formosa Island: Preparing Tea for the American Market at Tam-sui, Northern Formosa”

Source: Edward Greey, “‘Taiwan’: Formosa,” p. 29.

1. How many laborers were involved in the second-stage processing of tea in Dadaocheng and how did this labor pool evolve from the earliest years of the industry in the 1860s to the very first years of Japanese colonial rule?
2. Who were these tea-processing laborers? How many were laborers who migrated from Fujian versus workers hired locally? How was this labor force differentiated along gender lines?
3. How was tea processed in Dadaocheng, and under what working conditions? What salaries were paid to men and women involved in this stage of the tea industry?
4. What networks and mechanisms enabled the mobilization of labor, especially for workers who migrated from southern Fujian province?⁴

⁴ We wish to thank Dr. Lin Wen-kai (Institute of Taiwan History) and three anonymous reviewers for their extensive comments at various stages of our research. We attempted to respond to their criticisms and suggestions as our available sources and knowledge of the topic allowed.

In the analysis that follows, we begin with a brief overview of the various tasks undertaken by laborers employed by second-stage tea processing firms in Dadaocheng. Following that, we address the composition of the labor pool, as described in nineteenth-century trade reports and in the earliest investigations carried out by the Japanese colonial government after 1895. All of these sources are then employed in subsequent sections of the article to estimate, in a detailed way, changes in the size, composition and sources of laborers needed for the second-stage processing of oolong and baozhong tea in Dadaocheng. Customs and consular reports have been essential sources for our research, and we have supplemented them with tea industry photographs (taken by George Price in 1893), and the earliest surveys and investigations undertaken by Japanese colonial officials. Finally, we call the reader's attention to two tables in the Appendices: 1) statistics on the "Annual Tea Exports, Northern Taiwan, 1865-1905"; and 2) limited information on "Wages for Various Types of Tea Laborers in Dadaocheng." The tea export statistics were compiled from the annual "Reports on trade" published by the Imperial Maritime Customs Service and the annual "Reports on foreign trade" prepared by British consular officials in Tamsui. While we were unable to find substantive information on laborers' wages in nineteenth-century publications, we have summarized the few references found in early Japanese surveys.

Confronted with the limited scope of primary source data on laborers in the second-stage processing industry, we determined to develop a series of estimates which project the total number of tea laborers in Dadaocheng between 1865 and 1903. These estimates are derived from a combination of consular documents enumerating firms and total tea exports along with Japanese industrial reports providing data on total laborers in certain years. Brought together, these sources allow us to model the total workforce of Dadaocheng's second-stage tea industry through two distinct processes: 1) by workers per firm and 2) by annual productive output in pounds per worker. Each approach carries its own drawbacks, as the firm-based model only functions in certain years while the output-based variant is more sensitive to the distorting effects of changes in available capital and technology. In order to account for differences in source material and provide a spectrum of possible scenarios, we create six overall estimates and two which are specific to tea varieties, oolong and baozhong tea. Despite their limitations, the estimates are effective in illustrating the steady expansion of the tea industry's labor force from a total of 129 approximated workers in 1865 to a height of nearly 17,000 in 1902.

2. Overview of Second-stage Tea Processing in Dadaocheng

If Edward Greey's impressions of tea processing in Tamsui in 1871 were accurate, one would assume that both men and women were hired to sort tea processed in that town, that men outnumbered women by a factor of two, and that a relatively large number of overseers were needed to supervise this work of sorting tea. Although extant primary data for 1871 does not provide sufficient detail to discount Greey's emphasis of male laborers over women in sorting tea leaves, sources from later years claim that sorting tea in Dadaocheng was done by women and girls, not by men. Furthermore, missing from Greey's sketch and visual guidance were the many other steps in second-stage processing of tea, which have important bearing on the source of laborers, the numbers involved and the gendered division of work in Dadaocheng's tea processing firms. We begin to fill in those gaps with an overview of second-stage tea production in Dadaocheng, as described in contemporary sources.

(1) Oolong (wulong 烏龍) tea production

The earliest description of Taiwan oolong tea processing found in official English-language reports was recorded in early May 1873 by E. Colborne Baber, acting British consul stationed in Tamsui. In his description, Baber combined both on-site processing in the tea gardens and second-stage firing in foreign firms, or "hongs":

Preparation of the leaf. -- The process necessary to make 'Oolong' -- in which class Formosan teas are ranked -- is very simple; in fact such tea is the pure article in its most unsophisticated form, and with the least amount of manipulation. The green leaves are plucked from the bushes, and gathered into baskets by women and children; they are then spread on a covered floor for twenty-four hours; then stirred and tossed in a metal pan over a fire until they attain a curled-up, spongy appearance, and possess the proper smell. Finally, they are 'fired' in a wicker-basket shaped like an eggcut,⁵ the waist of which is divided by a sieve, upon which about seven pounds of tea are placed: the basket is set over an open charcoal oven, the fire of which has been previously banked up with lime and ashes, and emits no smoke.

The Oolong, however, when sold to the foreigner, has not been sufficiently fired

⁵ An "eggcut" (or "eggcup" in present day English) is a small cup used to hold a soft boiled egg.

to withstand the trying effect of a long voyage home, and has to re-undergo the latter process in the foreign hong for six to eight hours before it is finally packed into chests for export.⁶

That same year, the naturalist Joseph Steere visited “the tea establishment of Dodd & Co.” in Tamsui, where John Dodd and his assistants were preparing tea for export. Steere reported in his 10 October 1873 letter to the *Ann Arbor Courier* that “agents of the company showed me over the building where all the different processes of firing, boxing, painting, etc., were being carried on, all by Chinese, who have been brought from the tea regions of the mainland, as tea raising is still a new enterprise in this island.”⁷

While Dodd’s processing plant was situated in Tamsui in the early 1870s, most of the second stage processing of Formosan oolong tea was completed in Dadaocheng, a port city further upstream on the Tamsui River. The tasks required, however, were essentially the same, according to James Morrison, who provided a brief description in *The Geographical Magazine* in late 1877:

After the Formosan tea has been bought by the foreign merchant, it is fired under foreign supervision. This is done over holes lined with brickwork and filled with charcoal. After the charcoal has burned down, it is covered with ashes, and remains hot for many days. The tea is placed in baskets over the holes, and remains there three or four hours. The firemen are Chinese, who come over from the mainland for the season. The number who come yearly is not over 2000, and is rapidly increasing...The construction of tea-boxes is an industry of considerable importance. The wood comes from Foochow, ready cut to size, but the boxes are put together, covered with paper, and lined with lead in Twa-ta-tia. In 1875, 300 tons of lead were imported, the whole of which was used for lining tea and camphor-boxes. The tea is packed in chests, half chests, quarter chests, &c. A chest weighs 105 pounds, and contains 90 pounds of tea.⁸

While these early descriptions of the procedures carried out by foreign tea companies were all penned by visitors to the island, in 1885, the tea merchant John Dodd elaborated on the tasks involved while also confirming that second-stage

⁶ E. Colborne Baber, “Report on Foreign Trade at Tamsuy (Including Kelung) for the Year 1872,” in British Foreign Office Compiled and ed., *British Parliamentary Papers* (London: Harrison and Sons, 1873), China. No. 3 (1873), Part II, Commercial Reports from Her Majesty’s Consuls in China, 1872, p. 200.

⁷ Joseph Steere, “First Letter from Formosa,” *Ann Arbor Courier* (Ann Arbor) LXXII (10 Oct. 1873).

⁸ James G. Morrison, “A Description of the Island of Formosa, with Some Remarks on Its Past History, Its Present Condition, and Its Future Prospects,” *The Geographical Magazine* (London) 4 (Nov. 1877), p. 263.

processing of oolong tea in Twatutia had not changed much since the early 1870s. We quote his description in its entirety below, as it captures both the work required and the difficult environment in which it was completed.

Each tea picking hong has a large firing room attached. Small hong's have 50 to 100 fires and large hong's have about 200 to 300 fires and even more. The fire places are simply circular holes, about two feet in diameter, surrounded by brick facings. They are arranged in rows, and are not much more than eighteen inches above the floor of the room. The fire holes are apart about half a foot, and on the top of these circular holes or receptacles for live charcoal are placed the baskets containing tea. The fires are prepared in a simple way; a large pile of charcoal is lighted and allowed to burn till all the combustible matter contained therein has disappeared, and the red hot particles are placed by the firing men in the circular fireplaces. For several hours the fires are allowed to flare up and cast forth a flame and glow that few men can stand for any length of time. If you enter a large firing room at the time the fires are being lighted it is like going into an oven, and the return to the open air reminds you forcibly of the heated atmosphere of Montreal hotels, where inside the temperature is perhaps over 70 deg. and on going out of the front door you suddenly find yourself in an atmosphere several degrees below zero. This is putting it very mildly, for in a room with 300 fires the heat is far more intense. It takes time for the fires to settle down, and the red hot charcoal has to be broken up with iron implements; the red heat has to penetrate to the very core of the charred branches or portions of trunks of trees, and when no smoke whatever issues from the fire holes, the firing men place on top of the embers a thick covering of ashes of paddy husk, which deadens and tempers the heat to such an extent that in the course of 12 or 15 hours from the time the blazing lumps of charcoal were placed in the fire holes it is safe to place the baskets containing tea-leaves over them. The baskets are cylindrical in shape, about 2 feet in diameter and about 3 feet high; they are divided in two by a sieve partition, and on top of this sieve the tea is placed. The teas brought down from the hills and tea districts have undergone the sun-drying and absorbing process, have been fired in an iron pan, have been twisted by hand after passing through the rapid frying process, and on occasions are basket-fired up country.⁹

Alex Hosie's subsequent description of the fires and firing-baskets in the firing room of Twatutia generally replicated Dodd's earlier portrayal, though he situated the firing-baskets further apart and specified the depth of the fire holes at two feet.¹⁰ A photograph of such a firing room (Figure 2), taken by George Price

⁹ John Dodd, *Journal of a Blockaded Resident in North Formosa: During the Franco-Chinese War, 1884-5* (Hongkong: "Daily Press" Office, 1888), pp. 152-153.

¹⁰ Alex Hosie, "Report by Mr. Hosie on the Island of Formosa with Special Reference to Its Resources and



Figure 2 George Uvedale Price, “All through the night the tea simmered on the charcoal fires.”

Source: George Uvedale Price, *Reminiscences of North Formosa* (Yokohama: Kelly & Walsh, 1895), plate 11.

in 1893, indicates that density of fires was preferred, and the size of the firing baskets may have grown larger after their initial appearance in Twatutia in the early 1870s.¹¹

The work of migrant Chinese laborers employed in these firing room was both delicate and continuous. Before the firing of tea leaves could begin, combustible matter in the charcoal had to be consumed, and the smoke from the fire exhausted. “To attain this end men are constantly engaged in breaking up the live charcoal in the holes with long iron instruments.”¹² After the firing baskets filled with tea leaves had been placed over tens or hundreds of the firing stoves, the firemen had to constantly go round the baskets in the firing room and jostle the contents to insure uniform firing of the leaves within.¹³ It was not unusual for

Trade,” in British Foreign Office Compiled and ed., *British Parliamentary Papers* (London: Harrison and Sons, 1893), Commercial. No. 11 (1893), pp. 20-21.

¹¹ See George Uvedale Price, *Reminiscences of North Formosa*.

¹² Alex Hosie, “Report by Mr. Hosie on the Island of Formosa with Special Reference to Its Resources and Trade,” p. 20.

¹³ Alex Hosie, “Report by Mr. Hosie on the Island of Formosa with Special Reference to Its Resources and Trade,” p. 20.

firing to continue throughout the night. Writing a decade later than Dodd and Hosie, James Davidson captured the regularity of work by firemen tending the tea leaves in the firing room:

[F]or the first two or three hours [the leaves in the fire-basket are] left practically untouched. By that time it is well heated, and firing-men pass from basket to basket turning over the contents. This is repeated about every hour, thus permitting the heat to diffuse equally throughout the Tea.¹⁴

One important step in the second-stage processing of tea in northern Taiwan is poorly described in nearly all of these early British and American descriptions: the discarding of stems and foreign matter either before or after the tea leaves were fired. According to Alex Hosie, “when this firing is completed, the tea is spread out in flat bamboo baskets, and all pieces of twigs and leaf-stalks removed by hand. This part of the work is performed by women and girls.” This refined tea was then poured back into the firing-baskets, and “after being fired until every particle of moisture has evaporated, it is removed and packed hot in the lead-lined boxes for export.”¹⁵ Davidson, in contrast to his predecessors, gave pride of place to these women and girls in his description of the tea industry, but he indicated that their “picking out by hand the twigs, stalks and bad leaf” occurred *before* any firing had begun.¹⁶ This *pre*-firing removal of stems, broken leaf and foreign matter was confirmed in Japanese investigations undertaken during the same early years of Japanese occupation.

Davidson also provided one of the earliest descriptions of the subsidiary tasks related to packing tea for export, performed beyond the firing rooms. The dexterity of skilled lead artisans is captured in his portrayal of the work:

While hot from the fires the Tea is packed in boxes containing an inner case of thin lead, which when soldered, becomes air-tight and prevents the contents from spoiling... An iron pot and two pieces of tile constitute the whole apparatus required, and the rapidity with which plates of a very good quality are turned out is quite amazing. The labor is generally performed by two men, one of whom looks after the fire and trims the plates, and the other handles the tiles... Commencing operations

¹⁴ James Davidson, *The Island of Formosa, Past and Present: History, People, Resources, and Commercial Prospects-- Tea, Camphor, Sugar, Gold, Coal, Sulphur, Economical Plants, and other Productions* (abbreviated hence *The Island of Formosa, Past and Present*) (New York: Macmillan & Co., 1903), pp. 385-386.

¹⁵ Alex Hosie, “Report by Mr. Hosie on the Island of Formosa with Special Reference to Its Resources and Trade,” pp. 20-21.

¹⁶ James Davidson, *The Island of Formosa, Past and Present*, p. 384.

the Chinese with one hand lifts one side of the top tile up slightly, and with the other hand dips a little of the molten metal out of the pot and with a dexterous movement dashes it in between the two tiles; then, instantly dropping the upper one, and stepping upon it he applies sufficient pressure to force the melted lead to spread over the tiles. The metal hardens in a few seconds; the upper tile is again lifted, the newly made plate thrown out, and the operation continued as before. These plates, after having been trimmed, are soldered together in the shape of a box.¹⁷

As for constructing the tea chests, as Morrison noted in his 1877 description, the wood for these boxes arrived precut from Xiamen or Fuzhou and were put together without much difficulty. Then a paper covering (indicating the export firm) was pasted onto each chest, or they were painted with simple designs by local artists. Price captured both procedures at this stage in the processing of oolong tea in two of his 1893 photographs (see Figure 3 and Figure 4 below).



Figure 3 George Uvedale Price, “Long after the wearied Chaasze had laid down his spoon, could be heard the tap tap of the box maker as he hammered together the cases.”

Source: George Uvedale Price, *Reminiscences of North Formosa*, plate 9.

¹⁷ James Davidson, *The Island of Formosa, Past and Present*, p. 386. The thin sides of these lead linings can be seen in plate 10 of Price’s *Reminiscences of North Formosa*.



Figure 4 George Uvedale Price, “The streets were lined with masters of the palette and brush.”

Source: George Uvedale Price, *Reminiscences of North Formosa*, plate 7.

Comparing these various descriptions of second-stage tea processing in Dadaocheng spanning nearly thirty years, it would appear that few changes were made to basic procedures essential to the industry, though scale of operation may have affected costs or efficiency of production. Soon after their occupation of northern Taiwan in 1895, the Japanese began to conduct investigations of local agriculture and industry and this included the survey and compilation of data regarding extant practices related to the tea industry. A comprehensive comparison of these early Japanese investigations with the British and American reports cited above reveals an increase in the detail of descriptions of tasks required for each step in the processing of tea in Dadaocheng, but very little evidence of substantive change to any aspect of second-stage tea production. For example, in the first report published by the Productive Industries Department of the Government-General's Office (臺灣總督府民政局殖產部) in 1896, investigators named all the tools employed in sorting and firing oolong tea in Dadaocheng, and they

recorded in exacting detail the specific modes for using each tool, as well as the time required for every step in the successive processes. Distinctions were also made in firing times according to seasonal differences or the relative quality of tea leaves from the same season.¹⁸ If these investigations suggest an increased attention paid by producers to minute tasks in order to increase the quality of tea they processed, the result may have been reduced productivity per laborer and/or increased labor costs, but not any major change in modes of production compared with earlier decades.

(2) Baozhong (pouchong 包種) tea production

Although Formosan tea leaves had been used in the production of baozhong tea as early as 1873, the scenting with fragrant flowers and the final firing of the tea was accomplished in Fuzhou after partially fired tea had been purchased in Taiwan and shipped across the straits. The earliest production of baozhong tea in northern Taiwan is accredited to Wu Fulao (吳福老), owner of the Yuanlong Tea company (源隆號) in Tong'an County of Quanzhou Prefecture, who migrated to Taiwan in 1880-1881 and started to produce pouchong tea in Dadaocheng.¹⁹

One of the earliest description of the processes by which baozhong tea was produced in Dadaocheng comes from James Davidson's 1903 study of the Taiwan tea industry:

The most common method of manufacture is as follows: -- Tea, the same at this stage, though of a lower quality, as the Oolong exporters might be asked to buy, having been brought in from the country, is spread out on the floor of the building. The sweet smelling blossoms brought from the various gardens, freshly picked, after having been completely sprinkled with water, are now mixed with the Tea, and the mixture is then piled up to a height of 7 or 8 feet, separated by small partitions running out from the side of the room. The stuff is now carefully covered with a cloth to prevent the escape of the flowery odor. After some 7 to 17 hours, according to the kind of flowers used and the season, the scent from the blossoms is found to have thoroughly permeated the Tea leaves, and the mixture is then

¹⁸ Hara Kishiki, "Cha [Tea]," in Taiwan Sōtokufu Minseikyoku Shokusanbu, ed., *Taiwan sangyō chōsaroku* [Record of Investigation of Taiwan Industries] (Taihoku: Taiwan Sōtokufu Minseikyoku Shokusanbu, 1896), pp. 14-20.

¹⁹ Katō Hisae, "Taihokushū shita no kōbana sakumotsu I [Fragrant Flower Materials in Taihoku District I]," *Taiwan Nōjihō* (Taihoku) 207 (Feb. 1924), p. 40; also cited in Xu Yingxiang, ed., *Taiwan Riju shiqi chaye wenxian yiji* [Anthology of Translated Documents Concerning the Taiwan Tea Industry Under Japanese Rule] (Taipei: Taiwansheng Chaye Gailiangchang, 1995), p. 181.

turned over to the Tea picking girls who separate the now withered blossom from the Tea leaf. In the case of the small *Oleacear* flower, however, the separation is usually done by the aid of a sieve. When this is completed, the Tea is put on the fire for seven hours, being subjected to about 180° Fah. of heat, after which the manufacture is considered complete. The Tea is packed in small, gaudily labeled paper bags, and these in turn in half-chests.²⁰

An earlier Japanese source described the same general procedures for processing baozhong tea, but only one-half of the tea leaves were mixed with the fresh flowers, the other half kept in storage till it was added to the previously scented leaves prior to the final firing.²¹ As we were unable to locate descriptions of baozhong tea production in Fuzhou during the 1870s or any substantive references to the procedures employed in Dadaocheng prior to 1896, it is impossible to say whether any innovation or change in the production of baozhong tea had occurred in Dadaocheng during the last two decades of the nineteenth century.

3. The Labor Pool for Processing Tea in Dadaocheng

Perhaps the first task in our analysis of the men and women hired to produce tea in northern Taiwan is to examine the number and constituency of the labor pool employed by tea merchants, beginning in the 1860s and expanding in size with the growth of the industry. While detailed sources for the first decades are few and far between, several specific numerical estimates were made by tea merchants and officials who observed the industry at work. You will recall James Morrison's observation in *The Geographical Magazine* from late 1877, that: "The firemen are Chinese, who come over from the mainland for the season. The number who come yearly is not over 2000, and is rapidly increasing."²² Unfortunately, the next specific (and generally reliable) reference to numbers of laborers employed by tea companies in Dadaocheng appears in investigations carried out by the Japanese after 1895. Furthermore, they offer only contemporary statistics and make no attempt to estimate historical development of the labor pool. The first such source emerged from investigations conducted by the Productive

²⁰ James Davidson, *The Island of Formosa, Past and Present*, p. 388.

²¹ Hara Kishiki, "Cha," pp. 21-22.

²² James G. Morrison, "A Description of the Island of Formosa, with Some Remarks on Its Past History, Its Present Condition, and Its Future Prospects," p. 263.

Industries Section of the Taihoku District government (臺北縣內務部殖產課) in early 1896, and claimed that 252 companies in Dadaocheng employed a total of 3,612 employees; this did not include women and girls hired to sort tea leaves or to pick out flowers in the processing of baozhong tea.²³ Another early investigation conducted solely on the companies processing baozhong tea in Dadaocheng by investigators for the Government-General's Productive Industries Department in July of 1896 registered a total of 372 employees in sixteen baozhong tea companies.²⁴

In 1896, the Government-General's Department of Productive Industries published its general assessment of the tea industry in Taiwan, and the author attempted to estimate the total number of laborers needed for all operations related to second-stage tea processing in Dadaocheng. According to this report, more than two thousand laborers processed tea in this stage of production, and two hundred other specialists inspected the tea. Another one thousand laborers were employed to construct tea chests, make the lead linings and attach labels to tea chests and paint them. For the first time, the official reports estimated that ten thousand women were needed as tea sorters. If assistants and clerks were added, some twenty thousand people were involved in the second-level processing and packing of teas in Dadaocheng in 1895.²⁵ It is important to note here that this report gave substantively lower figures for the total number of Chinese and Taiwanese companies employing these laborers: 125 firms rather than the 252 that Zeng

²³ See the following early article for a detailed breakdown of the companies, owners, estimated capitalization and total employees: Zeng Naishuo, "Qingji Dadaocheng zhi chaye [Tea Industry in Daodaocheng during the Qing Period]," *Taipei Wenwu* (Taipei) 5: 4 (1957), pp. 99-117, citing the original Japanese source: "Taihokuken Naimubu Shokusanaka kenfu kyū Tansuiken Taihokushi chagyō meisaisatsu [Detailed Listing of the Tea Industry in Taihoku City, former Tamsui District, Investigated by the Reproductive Industries Department, Internal Affairs Division, Taihoku Prefecture] (31 Jan. 1896)." We were not able to find the original source for Zeng's data. However, we recalculated the statistics in Zeng's article and found 3,356 total employees, not his suggested number of 3,612. Among these 252 firms, there were three with zero laborers and one with no data.

²⁴ We did not have access to the original report, "Taiwan hōshucha [Taiwan Baozhong Tea]," in Taiwan Sōtokufu Minseikyoku Shokusanbu, ed., *Taiwan Sōtokufu Minseikyoku Shokusan hōbun (Nōgo no bu)* [Report on Industry by the Civil Affairs Bureau of the Taiwan Government General (Section on Agricultural Industries)], but the data was summarized in Hsu Hsien-yao, *Taiwan baozhongcha lunji*, p. 240. Fourteen of these companies were also included in Zeng's data, which was apparently collected earlier in 1895. The total employees for those fourteen companies was only 329. Once again, these totals do not include women and girls who sorted tea leaves prior to combining them with the flowers, nor did it include the number of women and girls who picked out the flowers during the production of baozhong tea.

²⁵ Hara Kishiki, "Cha," p. 38.

Naishuo cited from the Productive Industries Department, Taihoku District report. However, all these sources published in 1896 seem to agree that only sixteen companies were involved in processing baozhong tea.

James Davidson, the US consul for Formosa, devoted a large section of his *The Island of Formosa, Past and Present* to the tea industry, and among the many observations he made were these claims regarding tea companies and tea laborers in Dadaocheng (Tawatutia):

There are about one hundred and fifty Tea manufacturers big and small in Tawatutia, besides the half dozen foreign establishments. The largest firms employ from one hundred to three hundred Tea picking girls during the busy months; but, if there is much tea on hand and it is desired to rush matters, the number of tea pickers, working in one establishment, may reach, for a few days, four or five hundred. On an average the total number of ["Tea picking girls"] daily employed in Tawatutia exceeds some twelve thousand.²⁶

If Davidson's estimate were accurate, on average each of the 150 tea manufacturers would employ 75-80 women and girls to sort tea leaves. As for the male laborers, who were mostly seasonal migrants from China, Davidson did not provide any estimates, even though he described the firing processes and the construction of tea chests.

When the Provisional Committee to Investigate Old Customs (臨時臺灣舊慣調查會) published its report on the economic conditions of the island in 1905, a reduction in company numbers as well as total laborers had occurred, though it is uncertain whether this was the result of greater accuracy in surveying the industry or whether second-stage tea processing had been restructured by the new regime or by market developments. Though the report was published in 1905, dated content suggests that the quantitative data it reported relate to labor conditions in 1902 or 1903 at the latest. The investigators counted a total of seventy *fanzhuang* (番莊) who employed on average twenty male tea laborers (or 1,400 in total) and altogether hired 6,000-8,000 total female tea sorters to process an annual export of approximately 10,000,000 *jin* (an average of 150,000 *jin* per firm) of oolong tea. However, the baozhong tea share of production in Dadaocheng had apparently grown, for twenty-two *pujia* (舖家) firms now employed the same average number of male tea laborers per firm (thus 440 total

²⁶ James Davidson, *The Island of Formosa, Past and Present*, p. 385. Davidson's figure of "twelve thousand" is strictly the "tea picking girls" and not other laborers.

men), the same average number of female tea sorters as the oolong tea firms, and six hundred women and girls who picked flowers from the tea during that stage of the process. An annual total of 2,200,000 *jin* of baozhong tea was exported each year by these twenty-two *pujia* firms; each company thus produced approximately 100,000 *jin* on average.²⁷ The compilers of the report suggest that *on average* each of these 92 firms employed approximately twenty full-time [male] workers during the seven months of the tea season.²⁸ In addition, twenty-one *xiangzaiguan* (箱仔館) located in Dadaocheng specialized in the production of tea chests for the export market. Approximately four hundred workers were needed to make tea chests; this would include constructing the chests and creating the lead inner liners. In total, the compilers of the report estimated that every year some 2,200 tea laborers migrated from south China to conduct this work of processing tea in Dadaocheng.²⁹

Finally, from a retrospective summary of laborers migrating from China that was published in 1937, we get very specific statistics on the number of Chinese laborers who migrated seasonally to work in the tea industry as tea firemen, lead liner artisans or tea chest carpenters. 1904 is the first year for such specific totals in this report, and the statistics include the following: 882 tea-processing laborers, 15 lead liner artisans, and 23 tea chest carpenters who migrated from south China. This can be compared with a total of 6,549 “native” passengers arriving from Xiamen to Taiwan on steamships in 1904, compiled by customs officials.³⁰

²⁷ The average production per firm is given by the report; it is not our calculation.

²⁸ Rinji Taiwan Kyūkan Chōsakai, Dai Nibu, “Cha sangyō [Tea Industry],” in Rinji Taiwan Kyūkan Chōsakai, ed., *Rinji Taiwan kyūkan chōsakai dai nibu, Chōsa keizai shiryō hōkoku* [Report of the Investigation of the Economy, Second Division of the Provisional Committee for the Investigation of Taiwan Old Customs] (Taihoku: Rinji Taiwan Kyūkan Chōsakai, Dai Nibu, 1905), vol. 1, pp. 97-99.

²⁹ Rinji Taiwan Kyūkan Chōsakai, Dai Nibu, “Cha sangyō [Tea Industry],” pp. 89, 105.

³⁰ Matsuo Hiroshi, *Taiwan to Shinajin rōdōsha: Migi ni kansuru hitotsu no chōsa hōkokusho* [Taiwan and Chinese Laborers (An Investigative Report Concerning These Laborers)] (Taihoku: Nanshi Nanyō Keizai Kenkyūkai, 1937), p. 92; P.M.G. de Galembert, “Amoy Trade Report, for the Year 1904,” *Returns of Trade and Trade Reports for the Year 1904* (Shanghai: Statistical Department of the Inspectorate General of Customs, 1905), vol. 2, p. 678. For a detailed analysis of migrations between Xiamen and Taiwan, 1870s to 1911, see section IV of Douglas Fix, “Xiamen: Emigrants’ Portal to a Broader World,” (Center for Chinese Studies Working Paper, June 2018).

4. Estimating the Growth of the Second-stage Tea Processing Labor

While accurate time-series data on the growth of the labor pool in Dadaocheng during the latter part of the nineteenth century are not available, we do have useful statistics on total tea exports from northern Taiwan, as well as specific figures on oolong versus baozhong tea exports. Using these statistics together with some references to the growth of total tea-processing companies in Dadaocheng, it is possible to offer estimates of the growth in numbers of laborers involved in processing tea in Dadaocheng.

To begin this work, we first provide a brief listing of the growth in tea companies, culled from the primary sources:

1872: five British houses were involved in the tea trade.³¹

1876-8: 39 “native establishments” (“nineteen are local ones, five Cantonese, fourteen Amoy and one Swatow”) competed with 5 British firms³²

1879: 50 Chinese packing hongts produced tea for export³³

1884: 80 “native packing hongts” in Dadaocheng³⁴

1885: “small hongts” had 50-100 tea-firing stoves; “large hongts” had 200-300 stoves³⁵

1887: nearly 100 “native packing hongts”; 20-30 do a large business³⁶

³¹ William Gregory, Acting consul, Tamsuy, 28 June 1872, “Notes by Acting Consul Gregory on the Tamsuy Report and Returns for 1871,” in British Foreign Office Complied and ed., *British Parliamentary Papers* (London: Harrison and Sons, 1872), China. No. 2 (1872), Commercial Reports from Her Majesty’s Consuls in China, 1871, p. 138.

³² H.E. Hobson, “Tamsui Trade Report, for the Year 1876 (31 Jan. 1877),” *Reports on Trade at the Treaty Ports in China for the Year 1876* (Shanghai: Statistical Department of the Inspectorate General of Customs, 1877), p. 89; B.C. Scott, “Report on the Trade of the Ports of Tamsui and Kelung for the Year 1877 (27 March 1878),” in British Foreign Office Complied and ed., *British Parliamentary Papers* (London: Harrison and Sons, 1878), China. No. 7 (1878), Commercial Reports by Her Majesty’s Consuls in China, 1877, p. 151.

³³ Colin M. Ford, “Report on the Foreign Trade of the Ports of Tamsuy and Kelung During the Year 1879 (26 Feb. 1880),” in British Foreign Office Complied and ed., *British Parliamentary Papers* (London: Harrison and Sons, 1880), China. No. 3 (1880), Commercial Reports from Her Majesty’s Consuls in China, 1879, p. 239.

³⁴ E. Farago, “Tamsui Trade Report for the Year 1884 (24 Jan. 1885),” *Reports on Trade at the Treaty Ports in China for the Year 1884* (Shanghai: Statistical Department of the Inspectorate General of Customs, 1885), p. 258.

³⁵ John Dodd, *Journal of a Blockaded Resident in North Formosa: During the Franco-Chinese War, 1884-5*, p. 152.

³⁶ J.L. Chalmers, “Tamsui (26 Oct. 1887),” *Tea, 1888* (Shanghai: Statistical Department of the Inspectorate General of Customs, 1889), p. 88.

- 1892: 95 total “Chinese tea dealers”; 13 were large “tea hong”³⁷
- 1896/01: 252 *chaguan* (茶館)³⁸
- 1895/07: 6 foreign firms; 125 “Chinese and resident Taiwanese *chazhuang*” (茶莊)³⁹
- 1896: a small-scale tea processing firm processing 300,000 *jin* of oolong tea would require 19 [male] employees (two foremen, 10 firemen, 4 assistants, 1 accountant, and 1 tea inspector & his 1 assistant)⁴⁰
- 1902: 150 large and small “tea manufacturers” plus 6 foreign firms⁴¹
- 1902-3: 70 *fanzhuang* (番莊) manufacturing oolong tea; 22 *pujia* (舖家) manufacturing baozhong tea; 21 *xiangzaiguan* (箱仔館) constructing lead liners and tea chests; also numerous brokers: 71 *chazhan* (茶棧); 942 *chafan* (茶販); and 27 involved in tea-in-chest commerce (箱茶の買賣)⁴²

We have plotted these estimates of total tea manufacturing firms in Dadaocheng against the total number of tea exports, 1865 to 1903, culled from Imperial Maritime Customs Service trade reports and the Tamsui trade reports submitted by British consuls each year. The graph of this comparison can be seen in Figure 5 below, and it indicates a rather close correlation between the number of firms processing tea in Dadaocheng and the total amounts of oolong and baozhong tea exported from the island.

What this comparison does not allow is an estimate of the growth of the labor pool. Lacking the number of workers employed by each firm or even the total number of employees hired by all the companies in each of these seven specified years, one cannot begin to estimate the increase in laborers over time with these figures. However, such estimates can be made using other statistics, and we have attempted to do just that.

In spite of these limitations, the statistics contained in Zeng Naishuo’s 1957 article (derived from the registry compiled by the Taihoku District government’s Productive Industries Section and published January 31, 1896) provide an opportunity to examine how labor was distributed across tea firms in Dadaocheng.

³⁷ H.B. Morse, “Tamsui Trade Report for the Year 1892 (14 Jan. 1893),” *Reports on Trade at the Treaty Ports in China for the Year 1892* (Shanghai: Statistical Department of the Inspectorate General of Customs, 1893), p. 341.

³⁸ Zeng Naishuo, “Qingji Dadaocheng zhi chaye,” p. 101. We believe this number is too large as no other source provides so many firms involved in tea processing in Dadaocheng.

³⁹ Hara Kishiki, “Cha,” pp. 37-38.

⁴⁰ Hara Kishiki, “Cha,” pp. 40-41.

⁴¹ James Davidson, *The Island of Formosa, Past and Present*, p. 385.

⁴² Rinji Taiwan Kyūkan Chōsakai, Dai Nibu, “Cha sangyō,” p. 105.

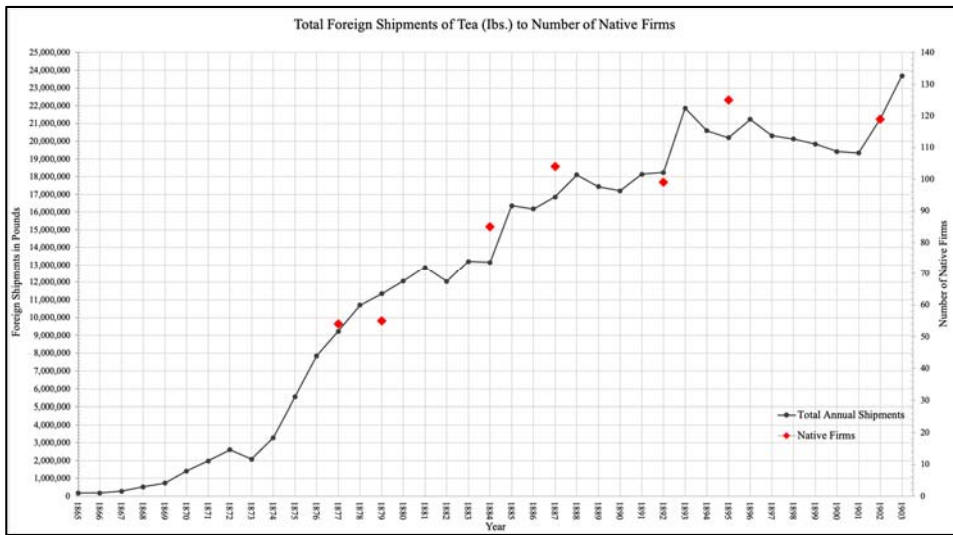


Figure 5 Total Foreign Shipments of Tea (lbs.) to Number of Native Firms, 1865-1903

Sources: Annual Customs Reports, published by the Imperial Maritime Customs Statistical Department; Annual Trade Reports compiled by British consular officials in Tamsui and published in the *British Parliamentary Papers* (see Appendix 1); and sources listed in footnotes 32-34, 36-37, 39, and 42.

Table 1 Number of Employees Hired by Dadaocheng Tea Firms (31 January 1896)

Employees Hired	Number of Firms	Total Employees
70 and above	1	72
50-54	2	102
45-49	1	48
35-39	1	35
30-34	6	195
25-29	9	238
20-24	24	510
15-19	47	774
10-14	90	1045
5-9	39	274
1-4	28	63
0	3	0
No data given	1	0
Total Firms	252	
Total Employees		3356

Source: Zeng Naishuo, "Qingji Dadaocheng zhi chaye," pp. 99-117.

From this data, it is possible to disaggregate the 252 firms involved in the tea industry between the latter half of 1895 and early 1896 by the size of their labor forces. The results of that disaggregation are found in Table 1 below, and with a graphic representation in Figure 6 below. While this data shows that the majority of the firms surveyed in early 1896 were comparatively small, their data cannot help us answer questions related to productivity according to the scale of operations because investigators did not compile tea output figures for each firm.

Examining this information more closely, we note that the average number of employees per firm is thirteen (13.5 to be exact), with the highest number of firms (90) falling into the 10-14 employee bracket. The total firms skew towards the smaller scale, with 82.59% of firms having 19 or less employees. Larger firms (i.e., greater than 20 employees) comprise 17.81% of the total number of firms, with larger firms employing 35.92% of the total labor force versus 64.53% employed by smaller firms. Secondly, it is important to note that Zeng's record of the Japanese survey of January 1896 does not include any information regarding the number of tea-sorting women required by each firm. It is also possible that some of these companies (perhaps 20-25) were involved in the construction of tea chests and not tea processing *per se*; Zeng did not make that distinction in his data.

This highlights the possibility that Zeng's figure of 252 is a disproportionately higher number of total firms when compared with the totals given in customs or

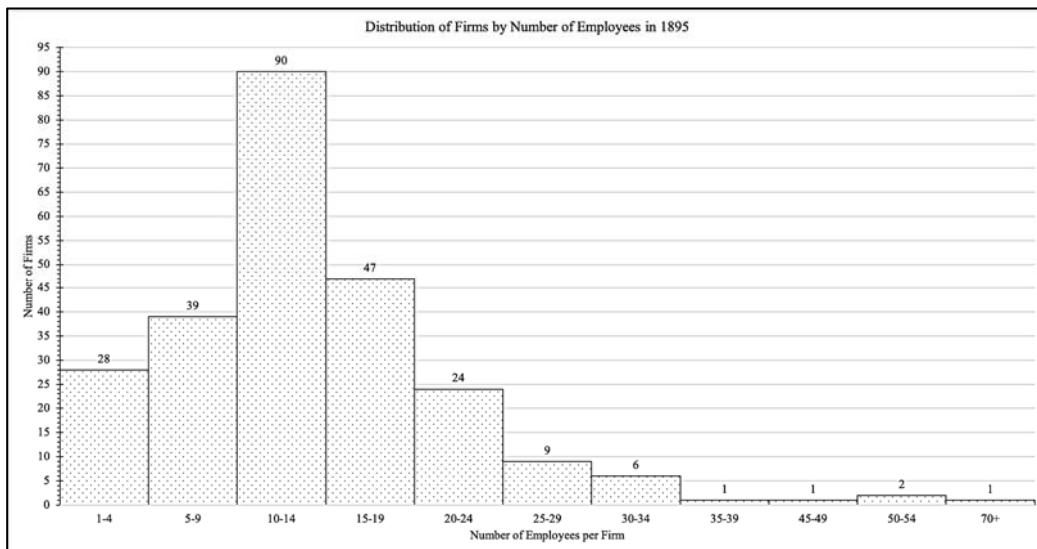


Figure 6 Distribution of Firms by Number of Employees in 1895

Source: Zeng Naishuo, "Qingji Dadaocheng zhi chaye," pp. 99-117.

trade reports or those provided in the survey conducted by the Productive Industries Department, Government-General's Office. (See Figure 5 and the discussion preceding that figure above). However, it is possible that local Japanese officials who surveyed the tea industry in Dadaocheng in late 1895 were more systematic in their investigations than earlier officials or the foreign participants in the tea industry who provided customs officials and British consuls with their information. However, given the very small number of employees hired by small-scale companies in Zeng's data, it is also possible that many of those firms were not involved in actually processing tea. Thus, the large number of firms cited in Zeng's statistics, from the early 1896 Japanese investigation, would imply that any estimate of total labor based on the number of firms for other years may underrepresent the number of laborers working in the tea industry.

It is also necessary to consider the context of the January 1896 report in the period following the Sino-Japanese War and the occupation of Taiwan. Given the likelihood that this report was derived from data collected within the seven months following the Japanese occupation of Taipei on June 7, 1895, how did the wartime conditions of 1894-1895 affect the report's representation of the industry and its total number of laborers? Our first hint begins with the export figures displayed in Figure 5, with a 5.81% decline in total exports from 1893 to 1894 followed by a further decline of 1.89% from 1894 to 1895.⁴³ While notable, this drop does not represent a significant change in production as over 20 million pounds of tea still departed Dadaocheng in 1895. Shipping figures provided by Consul Morse demonstrate some decline in vessels arriving and departing Tamsui (a drop of 10.43% between 1893 and 1894), but this is not significant enough to support the possibility of a blockade or severely hazardous conditions created by the war.⁴⁴ Furthermore, Morse's June 26, 1895 trade report cites 66 steamers both entering and departing Tamsui harbor, indicating that movement was still possible leading up to the Japanese landing of troops on May 29. James Davidson echoes this relative normalcy for foreign traders following the Japanese occupation of Taipei, stating that "Business, which had been at a complete standstill for several days, revived with a rush the very day the troops arrived."⁴⁵ Finally, passenger

⁴³ See Appendix 1, "Annual Tea Exports, Northern Taiwan, 1865-1905," years 1893-1895.

⁴⁴ H.B. Morse, "Table No. 1, Shipping," "Tamsui Trade Returns for the Year 1894," *Returns of Trade and Trade Reports for the Year 1894* (Shanghai: Statistical Department of the Inspectorate General of Customs, 1895), p. 361.

⁴⁵ James Davidson, *The Island of Formosa, Past and Present*, p. 313.

traffic data collected in Xiamen reflects considerable mobility between the mainland and Taiwan for the duration of the war. Passengers departing Xiamen for Taiwan declined by only 9.7% between 1893 and 1894, and actually increased the following year by 2.92%.⁴⁶ The only major deviation is the decline of passengers arriving in Xiamen from Taiwan in 1894, followed by a near doubling of passengers arriving in 1895. This is unsurprising considering the Japanese occupation of Taiwan, and may also reflect the return of migrant laborers who had remained in Taiwan during the war. The relatively unrestricted movement of people to and from Taiwan further indicates that the flow of migrant laborers which the tea industry relied upon was not significantly constrained by the war. Together with the export and shipping statistics, this evidence supports the use of the January 1896 report as illustrative of Dadaocheng's second-stage processing firms and their employees.

From the data that we have been able to compile from a range of historical sources, there is only one instance in which the specific composition of employees hired by a Dadaocheng tea processing company is given. In order to process 300,000 *jin* of tea during the eight months of the tea processing season, this firm had to hire the following employees:

- a. 2 tea-processing foremen
- b. 10 tea-processers
- c. 4 assistants
- d. 1 accountant
- e. 1 tea inspector
- f. 1 assistant tea inspector

To pay these nineteen employees for the 8-month period, the owner would need 1,200 *yuan* in salary and 800 *yuan* in food. The firm would also need many female tea sorters, but that number was not specified.⁴⁷

This single example raises some concerns, which make it a rather questionable source for obtaining the productive output of a company hiring nineteen employees. It is difficult to assume that a tea processing firm employing thirteen laborers (which is the average we gained from Zeng's data) would produce far less tea than a firm with these nineteen employees. Since we know the total tea export for 1895 was 133,998 *dan* (擔 piculs), if even half of the tea

⁴⁶ Douglas Fix, "Xiamen: Emigrants' Portal to a Broader World," pp. 22-23.

⁴⁷ Hara Kishiki, "Cha," pp. 40-41.

companies in Zeng's dataset who hired fewer than 20 employees each produced 300,000 *jin* of second-stage-processed tea, their production alone would exceed the total amount of tea exported that year. Consequently, it is impossible to assume this nineteen-employee firm is exemplary in terms of average output for a Dadaocheng tea company in 1895.

With these various concerns in mind, we use some of the more specific data from Zeng's 1957 article to estimate the total annual labor needed for second-stage processing in Dadaocheng, 1865-1903.

The first of these estimates is a point estimate using the average number of laborers employed at small firms (with less than 20 employees) in 1895 and the average number of laborers employed by large firms (with greater than 20 employees) in 1895. As we know the number of large and small firms for several years, we can get a rough estimate of their total number of employees. Note, however, that this approximation excludes the tea-sorting women, and may exclude the laborers constructing tea chests. It should further be noted that all foreign firms in the sample (which are included in the number of total firms up to and including 1892, whereafter they likely shifted away from second stage processing) are counted as large firms in years with large/small firm breakdowns. To calculate this rough estimate, we divided Dadaocheng's tea processing firms into two segments, large and small firms. With 1,200 employees hired by the large firms in Zeng's data (an average of 27.27 employees per firm) and 2,156 employees for small firms (an average of 10.57 employees per firm), we get a closer estimate of the total number of employees than if we simply used the average of 13.5 obtained by dividing the total number of employees by the total number of companies and projected that on the total number of firms for different years. We then apply this two-part division for years in which we have estimated numbers of large versus small tea processing firms. However, we use 13.5 for those years when we do not have such distinctions. The results of this calculation are plotted for seven specific years in Figure 7 below; look for the black squares, indicating "Firm level estimate." That graph also includes an output-based initial estimate, which is described below.

The second estimate, "Output-based initial estimate," is calculated from the total output of all Dadaocheng tea firms in 1895 (using the tea export statistics) in order to avoid the underestimating bias of the firm level estimate. According to the Cobb-Douglas function, production output is equal to the product of the amount of labor used, the physical capital invested, and the total factor productivity

(or TFP, a measurement of the change in output that is not resultant from a change in inputs, i.e., labor or capital, often used to account for technological changes). As a result, within any given period, presuming there are no changes in either total factor productivity or capital inputs, there is a set ratio between the total production output and the amount of labor used. As we know the total production output in 1895 was 20,201,066 pounds of tea for 3,356 workers (which excludes female tea sorters and potentially the tea chest laborers) in 248 firms, it would be possible to derive a ratio of total output per worker. In this case, this ratio is 6,019.39 pounds of tea in total output per worker in 1895. Using this ratio, we can project a very rough estimate of the total number of employees in all years where we have tea export data by dividing the total tea exports by the ratio of pounds of tea per worker. These results are plotted in Figure 7 with black dot and dash.

As is clear from the production function, this estimate necessitates the assumption that the ratio of capital inputs and TFP relative to the production output remain the same across periods. It is very likely this assumption is not met, as both annual capital inputs for firms and total factor productivity are expected

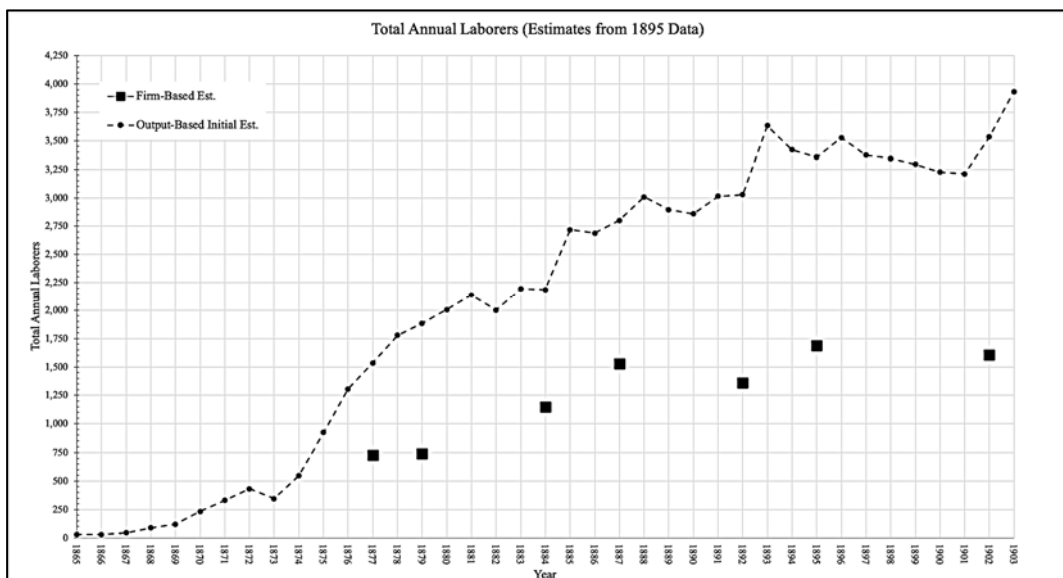


Figure 7 Total Annual Laborers (estimates from 1895, excludes sorters and artisans), 1865-1903

Sources: Hara Kishiki, "Cha," pp. 40-41; Zeng Naishuo, "Qingji Dadaocheng zhi chaye," pp. 99-117; sources listed in footnotes 32-34, 36-37, 39, and 42; and Annual Customs Reports and Annual Trade Reports (see Appendix 1).

to change across periods. These changes are likely to have a significant distorting effect on all estimates derived from the ratio of output to labor. However, given the limitations of available data, output-derived estimates provide a necessary glimpse into the labor market in the Qing era, and are better at accounting for changes in demand than firm-based estimates. Whereas firm level estimates are likely to stay constant despite changes in economic conditions, output-based estimates are better able to demonstrate the real changes in labor which likely took place as demand for tea shifted.

The insights offered by output-based estimates can be improved by understanding the distorting effects of potential changes in both capital and total factor productivity. Changes in capital may be attributed to changes in physical capital, such as machinery, or changes in financial assets, which improve a firm's ability to purchase new physical capital and also necessary inputs for the production process. The most relevant form of physical capital in Taiwan's nineteenth-century tea industry is the tea firing stoves used in second-stage processing. According to John Dodd, in 1885 "small hong" possessed between 50-100 tea-firing stoves, and "large hong" had 200-300 stoves and even more.⁴⁸ Therefore, there is likely a marked difference between the productive output of small firms versus large firms. As a result, larger firms with higher capital would likely have a larger total production output for the proportion of laborers they employed. This would mean that the estimate provided here, and other output-based estimates, likely overestimates the number of total employees. As time progresses in our sample, it is possible that the total input of physical capital grew as firms procured more stoves, but as no changes in the efficiency of these stoves seem to have occurred, adding more firing stoves would also require the employment of more laborers as firemen. With an increase in output as a result of an increase in physical capital, one might expect a proportional increase in the amount of labor required as an input to meet the requirements of new physical capital. While we would not expect firms' physical capital to change significantly year to year after an initial start-up period, financial assets are likely to fluctuate both across years and within them. However, the allocation of these assets between necessary production inputs, from tea, to flowers (in baozhong tea), to wages for laborers, is likely to stay at constant ratios and only fluctuate based on the total capital

⁴⁸ John Dodd, *Journal of a Blockaded Resident in North Formosa: During the Franco-Chinese War, 1884-5*, p. 152.

available to the firm and the market-based demand for tea in any given season. Resultantly, we would expect changes in financial assets to change in step with labor's relationship to output, which is accounted for in the output-based estimates.

In the tea industry, the most likely sources of change in total factor production are changes in technology and changes in political administration. Improved manufacturing processes, better infrastructure, and even more efficient business practices may all have increased the total annual tea output relative to the number of workers employed. We lack any indication that the process of manufacturing tea within factories changed significantly during the nineteenth century, so it is unlikely that new manufacturing processes played a major role in changing output. New infrastructure introduced following Japanese colonization may have increased the amount of tea available to second-stage processors, and improved their ability to export tea, thus increasing output. However, as with increases in physical capital we would expect this increase in output to be followed by an increase in hiring workers to match the new levels of tea available to be processed. More efficient administrative practices may have altered the level of foremen and tea inspectors required by the industry, and this could potentially result in an overestimate of total labor, albeit a small one due to the smaller number of these kinds of employees. We would also expect a number of changes resulting from the Japanese occupation of Taiwan. In 1895 and the years immediately following, there may have been a fall in output due to disruptions in all aspects of the production chain.⁴⁹ This fall would likely be accompanied by a corresponding drop in labor demand, and thus laborers employed, due to the reduced amount of tea being processed. As new immigration restrictions from the mainland were introduced by the Japanese, it is possible that industry producers were unable to find adequate labor for more specialized jobs. However, it is unlikely these jobs were eliminated altogether; instead, the positions were probably filled by Taiwanese workers.

Clearly, the cross-firm estimate, and the other estimates based on output, have a number of problems which diminish their accuracy. They likely overestimate the total labor inputs in years other than 1895, especially for the early period of our sample, as firms first establishing themselves likely grew in output at a higher rate relative to the amount of labor input, as a result of physical capital increases. The estimate also does not account for differences between firms, or the ratio of

⁴⁹ A decrease in total exports did occur. See the Appendix for the amount of that decline.

small to large firms. Finally, it does not account for potential changes in total factor productivity (TFP), resulting in an overestimate of total labor in our sample. Finally, this estimate only includes the workers employed by firms and counted in Zeng's 1896 data set, and thus excludes the previously mentioned female tea sorters and perhaps some of the tea chest artisans.

The third estimate derived from the 1895 data, represented by the red squares in Figure 8 below, is the "Firm-based combined estimate." This estimate attempts to capture the total number of workers employed by firms in the industry by adding data on female tea sorters and tea chest artisans to the firm-based estimate's approximation of total laborers. We know from Hara Kishiki (原熙識)'s 1896 Japanese report that approximately 10,000 female tea sorters were employed in the industry in 1895.⁵⁰ The same report describes 125 native second-stage processing firms (and six foreign firms who are likely no longer involved in tea firing), meaning that for every firm approximately 80 female tea sorters were hired per year.⁵¹ We also know from the 1896 report that 1,000 artisans were employed in tea chest construction, thus averaging eight artisans employed per firm. While artisans were likely employed by firms exclusively producing tea chests, the ratio of artisans to other laborers and to female sorters is expected to stay the same, as all producers required tea chests in order to export their product. These new amounts are then multiplied by the number of firms in each year and added to the estimates produced by the original firm-based estimate which dealt exclusively with laborers employed by firms.

The firm-based combined estimate encounters a number of difficulties in attempting to approximate a larger portion of the labor force involved in second-stage tea processing than the original firm-based estimate. The first is the fact that the number of female tea sorters required by each firm likely changed throughout the year, with different firms possibly hiring the same workers at different periods. This could result in a possible overcounting of the number of tea sorters. However,

⁵⁰ Hara Kishiki, "Cha," p. 38.

⁵¹ It should be noted here that while the 252 firm data (Zeng 1957) has been used to obtain the number of laborers in the industry using an average of 13.5 laborers per firm, the Japanese report's 125 firm estimate is used to obtain the ratio of female sorters per firm and the ratio of artisans per firm. This choice was made for two reasons. The first is the 252 firm data's inclusion of numerous small firms which are likely not accounted for in the 1896 Japanese report's estimate of 10,000 female laborers and 1,000 artisans. The second is a comparison with the 1902 data, where the average is 76 female sorters per firm, making the estimate from the 125 firm data appear more reasonable.

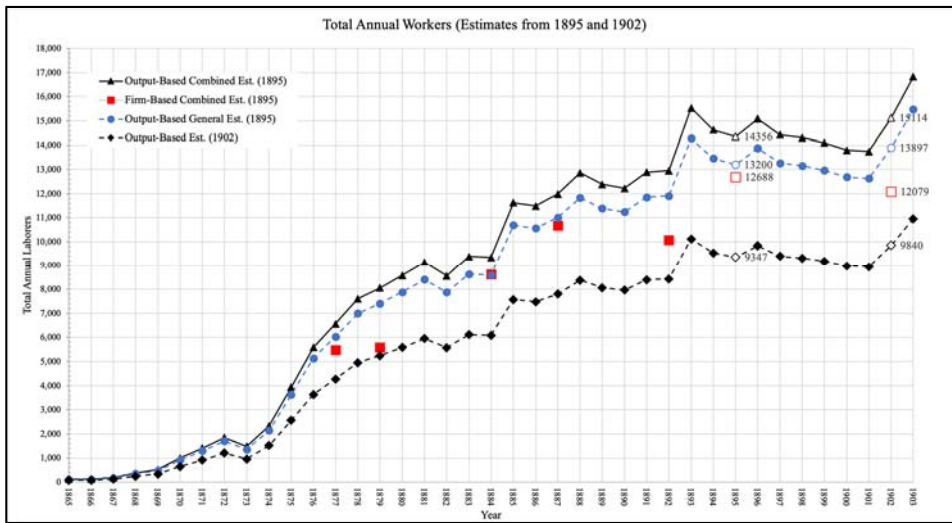


Figure 8 Total Annual Employees (estimates from 1895 and 1902), 1865-1903

Sources: Hara Kishiki, “Cha,” pp. 37-38; Zeng Naishuo, “Qingji Dadaocheng zhi chaye,” pp. 99-117; sources listed in footnotes 32-34, 36-37, 39, 42 and 52; and Annual Customs Reports and Annual Trade Reports (see Appendix 1).

the Japanese estimate appears to account for the total number of female laborers employed across the year, and we would expect this ratio to stay similar across the analyzed period. Secondly, as Zeng’s 252 firm data, which was used to produce the average number of laborers (not sorters or artisans) per firm, potentially included the aforementioned tea chest firms, it is possible that, with the addition of the eight tea chest artisans per firm, we are overestimating the total number of artisans.

The fourth estimate, titled the “Output-based general estimate,” in Figure 8, uses the 1896 Japanese report’s approximations of workers along with output figures to project total laborers in a similar fashion to the output-based initial estimate (in Figure 7). The laborers accounted for in this data include: 2,000 reserved laborers, 1,000 tea chest artisans, 10,000 female tea sorters, 200-plus tea inspectors, and an apparent 6,800 “assistants and clerks,” which raise the total number of workers in the industry to 20,000. All of these numbers except for the 6,800 assistants appear reasonable estimates based on both the 1902 data, Zeng’s 252 firm data, and the 19-worker firm example. Within the 19-worker firm, only three of the 19 employees are described as assistants, making a ratio of 2,000

laborers to 6,800 assistants incredibly unlikely. For this reason, these workers are excluded from this estimate, resulting in an industry total of 13,200 workers in 1895, and an output-to-worker ratio of 1,530.38 lbs. per worker annually.

The fifth estimate, or the “Output-based combined estimate,” in Figure 8, is derived from the combination of the known employees (likely comprised of foremen, firemen, assistants, inspectors & assistant inspectors, accountants, and potentially some tea chest artisans) from the “Output-based initial estimate” together with the 10,000 female sorters and 1,000 artisans from the 1896 Japanese report. This estimate is intended to provide an intersection between the very precise information provided in the cross-section assessment and the more industry-encompassing enumeration from the general estimate. As we are fairly certain the 3,356 workers enumerated in Zeng’s data include any possible tea inspectors, the 200 tea inspectors from the 1896 data are not included. With 3,356 workers, 10,000 female sorters, and 1,000 artisans, the total workers employed in 1895 are estimated to be 14,356. When that year’s total output (20,201,066 lbs.) is divided by the total workers, we get an output to worker ratio of 1,407.15 lbs. per worker annually.

There are two principal issues with this estimate, excluding those already discussed that apply to all output-based estimates. It is possible, therefore, that by applying the 3,356-worker data, we are actually underestimating the total number of laborers in the 1896 industry. The second is that the 3,356 workers provided in Zeng’s data likely include some tea chest artisans working at tea chest firms, but it is impossible to distinguish them from other laborers and other firms. In order to not risk missing some of these artisans, the 1,000 artisans estimate from the Japanese report is included.

The Japanese report published in 1905 by the Provisional Committee to Investigate Old Customs (which likely reflects the state of the industry in 1902) provides another point from which to estimate the total number of annual workers. According to the report, 70 *fanzhuang* and 22 *pujia* each employed an average of 20 laborers (1,840 workers in total), and all together hired 6,000-8,000 female sorters. The *baozhong* producing firms hired an additional 600 female flower pickers. There were also 400 tea chest artisans active in the industry. From the same report we are given an estimate of 2,200 workers who arrived from the mainland to be employed by the industry. These migrants were likely a mixed group of foremen, laborers, inspectors, and tea chest artisans. While this number

may provide a more accurate estimate of the total laborers employed than the estimate derived from the 20-worker average, it overlaps with the 400 tea chest artisans, who are a composite group of both migrants and local Taiwanese. In order to avoid double counting these artisans, we choose to use the 1,840-worker estimate instead. For comparative purposes, this 1902 output-based estimate is presented both in Figure 8 alongside other overall estimates and in Figure 9 against the baozhong and oolong models. As we know both the number of workers involved in oolong and baozhong production, along with the total output of oolong and baozhong tea produced between 1893 and 1903, we can create separate worker estimates for both industries.⁵²

To begin with oolong production, 70 firms employed a total of 1,400 workers in 1902. We assume that the total number of female sorters falls at the center of the 6,000-8,000 estimate (7,000 sorters), and as we expect these sorters to be employed by both the *fanzhuang* and *pujia* firms, the average number employed per firm is approximately 76 (7,000 sorters divided by 92 firms). Seventy-six sorters in 70 *fanzhuang* firms means a total of 5,320 sorters employed in oolong production. In total, there are 6,720 individuals employed in the oolong industry in 1902, which, gives a total output per worker of 2,767.79 lbs. of oolong tea per worker (18,599,532 lbs. divided by 6,720 workers). This estimate is represented by the dashed line with squares in Figure 9 below.

The process for estimating the baozhong workforce is very similar. With 20 laborers and 76 sorters per firm working at 22 *pujia*, there are 440 laborers and 1,680 female tea sorters total. The *pujia* firms also hire 600 female flower sorters as an industry (to separate flowers from tea leaves before the leaves are fired). With a total of 2,720 employees in the entire baozhong industry, the total annual output per worker in 1902 is 980.72 lbs. of baozhong tea per worker (2,667,558 lbs. divided by 2,720 workers). The total annual laborers in the baozhong industry are represented by the blue dashed line with circles in Figure 9.

Being output-based estimates, these approximations of the laborers in the oolong and baozhong industries suffer from the same distortions as the previously discussed estimates, albeit over a shorter period of time. Another issue with these two estimates is the amount and distribution of female tea-sorter labor. The 6,000 to 8,000 estimate provided in the 1905 Japanese report is much lower than the 10,000 female tea laborers estimated in the 1896 Japanese report. While we cannot

⁵² Rinji Taiwan Kyūkan Chōsakai, Dai Nibu, “Cha sangyō,” pp. 89, 97, 99, 105.

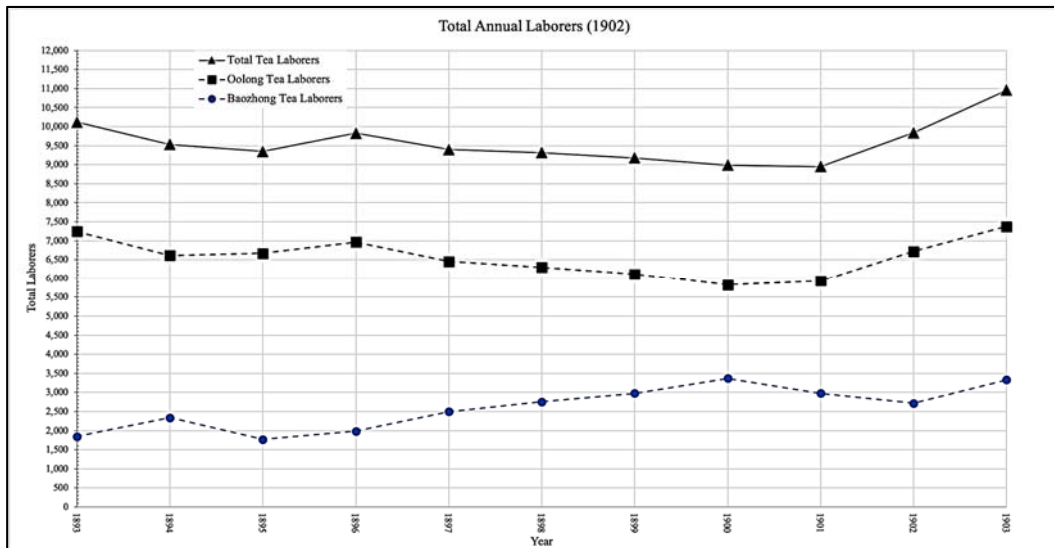


Figure 9 Total Annual Laborers by Tea Type (based on known workers in 1902), 1893-1903

Sources: Rinji Taiwan Kyūkan Chōsakai, *Dai Nibu*, “Cha sangyō,” pp. 89, 97, 99, 105; Hsu Hsien-yao, *Taiwan baozhongcha lunji*, pp. 9, 240; “Taiwan hōshucha,” vol 1, Part 1, pp. 13-15; Zeng Naishuo, “Qingji Dadaocheng zhi chaye,” pp. 99-117.

know which of these reports is a better representation of the actual number of female tea workers, it provides a potential reason to expect the total laborer estimate for 1902 to be lower than the estimate for 1895.

The final 1902 estimate (in Figures 8 and 9) combines the total workers in both the oolong and baozhong industries in 1902 with the tea chest artisans to produce an output-based estimate similar to those obtained from the 1895 data. With 6,720 oolong workers, 2,720 baozhong workers, and 400 tea chest artisans, the total number of workers in the 1902 tea industry was approximately 9,840 workers. With 21,267,090 lbs. of tea produced in 1902 by these workers, we get an annual output to worker ratio of 2,161.29 lbs. per worker. While compensating for the potential differences between the amount of sorter labor used in the separate oolong and baozhong industries, this estimate still suffers from the distortions both of a potential underestimate of sorters by Japanese officials and by the already attributed issues with output-based estimates.

An 1896 investigation of the baozhong tea processing firms, a much smaller number of total companies, will allow one to focus on just one part of the overall

tea industry.⁵³ These statistics on the sixteen firms processing baozhong tea in Dadaocheng in 1896 provide information on tea firm name, owner's name, total capitalization and the number of employees. The results of that investigation are given below in Table 2. To these we have added corresponding information from Zeng Naishuo's figures, which come from a different Japanese investigation, which Zeng dates to 31 January 1896. Names, capital amounts and total employee data given in red font in Table 2 indicate Zeng's disparate information.

As "Taiwan hōshucha" 臺灣包種茶 (1896) provides year-by-year data on the number of firms as well as a new sample with which to approximate the number of laborers in the baozhong industry, we are able to produce a new firm-based estimate of baozhong labor which can then be compared to our projected baozhong estimate from 1902.

Table 2 Companies Producing Baozhong Tea in Daodaocheng (1896)

Company Name (Date Established)	Owner(s)	Capitalization	Workforce
Jin Fang 錦芳 (est. 1886)	Wu Shifen 吳士份, Weng Sheshi 翁瑟士	20,000	72
Jian Tai 建泰 (est. 1886)	Chen Zhenji 陳振記	10,000 (--)	32 (--)
Yong Yu 永裕 (est. 1883)	Wang Yongjin 王永金 (Chen Yulu 陳玉路)	100,000 (10,000)	25
Ying Yuan 英元 (est. 1883)	Li Qing 李卿 (Li Qingyun 李卿雲)	100,000 (10,000)	25
Fujian Chang 福建昌 (est. 1886)	Chen Huixue 陳煇雪	20,000	24
He Xing 合興 (est. 1883)	Wang Anding 王安定	100,000 (10,000)	21 (32)
Yong Mian Li 永綿利 (est. 1886)	Chen Chenchuan 陳辰傳	100,000 (10,000)	21
Fang Cheng 芳成	Huang Yongjin 黃永錦	4,000	21
Zhen Nan 震南 (est. 1886)	Huang Tianding 黃添丁, Huang Shousheng 黃守聲	1,000 (10,000)	21
Yong Shun Long 永順隆	Hong Fuchen 洪輔臣	5,000	19 (16)
Gong Ji 恭記 (est. 1886)	Huang Heti 黃何題	7,000	17
Guang Sheng Long 廣盛隆	Qiu Ji 邱吉	5,000	17
Quan Mei 泉美	Bai Zhukui 白燭奎	1,500	17
Zhen Ji 珍記	Lin Jinshi 林進十 (Lin Jinping 林進平)	1,000	13
Fu Ji Xing 福集興	Fu Fubai 傅浮伯	4,000 (--)	13 (--)
Zhen Chun 珍春	Wang Wenge 王文葛	1,000	8
Total Laborers:			366 (329)

Sources: Hsu Hsien-yao, *Taiwan baozhongcha lunji*, p. 9, 240; Taiwan Sōtokufu Minseikyoku Shokusanbu, ed., "Taiwan hōshucha," vol 1, Part 1, pp. 13-15; Zeng Naishuo, "Qingji Dadaocheng zhi chaye," pp. 99-117.

⁵³ As we were not able to access the original Japanese report, "Taiwan hōshucha," our information comes from Hsu Hsien-yao's 2005 summary.

In order to obtain an average number of employees per baozhong firm, it is first necessary to remove the 72-employee outlier from the dataset. This firm is twice as large as the next largest firm, and will be reincorporated on its own into the final firm level estimate in order to not disrupt the average. With this outlier removed, the average number of employees across the remaining 15 firms is 24.4 workers per firm. In addition to the 24.4 workers per firm, we know from the 1902 data that 76 female sorters and 27.27 pickers (600 pickers divided by 22 *pujia*) are required by each firm. In addition to these general estimates, we can also be more specific for the years 1883 and 1886 due to the establishment dates of the firms. For instance, “Taiwan hōshucha” cites three firms established in 1883 that were employing a total of 71 laborers in 1896. While it is likely that these firms had fewer workers in the year they were established, this estimate should still be more representative of the total number of employees than by applying the average to all firms, which is also derived from 1896 data. The same method is applied for the estimates for 1886, with 258 laborers employed by the six firms together.

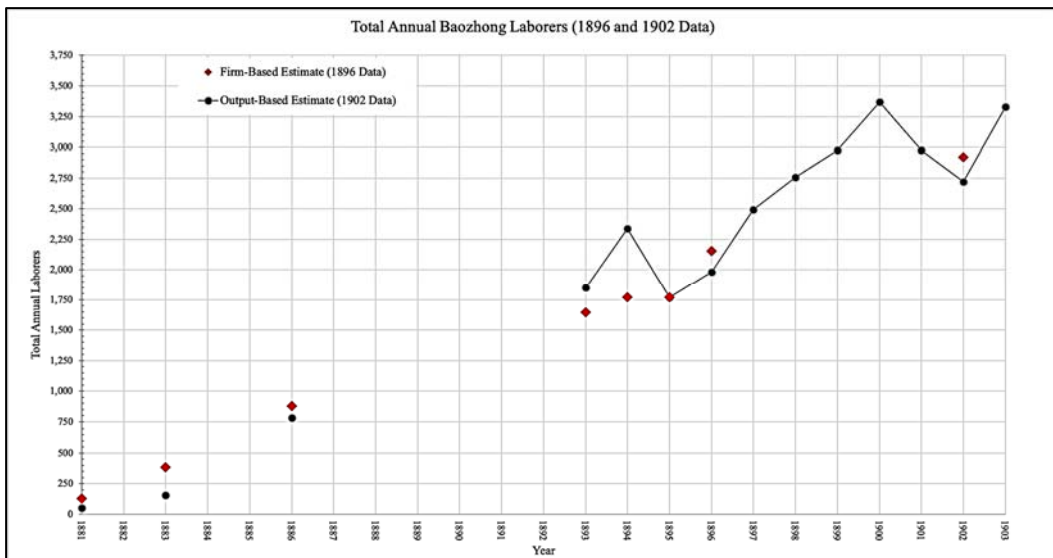


Figure 10 Total Annual Baozhong laborers (1896 and 1902 data), 1881-1903

Sources: Hsu Hsien-yao, *Taiwan baozhong tea lunji*, pp. 9, 240; Taiwan Sōtokufu Minseikyoku Shokusanbu, ed., “Taiwan hōshucha,” vol. 1, Part 1, pp. 13-15; Zeng Naishuo, “Qingji Dadaocheng zhi chaye,” pp. 99-117; Rinji Taiwan Kyūkan Chōsakai, Dai Nibu, “Cha sangyō,” pp. 89, 97, 99, 105; and Annual Customs Reports and Annual Trade Reports (see Appendix 1).

For the year 1881, the one active firm is determined via the 1896 average, and for all years following 1886 the average is used for firms with unknown values (6 of 12 firms in 1893, 7 of 13 in 1894, and so on). When compared (see Figure 10) with the output-based estimate of baozhong firms derived from the 1902 data, both estimates illustrate a fairly close relationship for the years covered by the firm-based estimate. This grants credence to the use of the output-based estimate as a less accurate but more comprehensive approximation of total laborers.

5. Wages: What Little We Know

In the historical sources on the Taiwan tea industry, neither labor wages nor labor conditions during the nineteenth century are described in any detail. In his trade report for 1880, Walter Lay claimed that men employed in tea-firing earned six dollars a month.⁵⁴ During the next decade, two foreign consuls reported that wages were sufficiently high in Taiwan to draw laborers away from Xiamen and to preclude a shift in local Formosan laborers to the sericulture industry, whethertending silkworms or reeling silk.⁵⁵ To assess these claims would require substantive and accurate data on wages in Xiamen, as well as those for reeling silk or tending silkworms in northern Taiwan -- statistics that we do not have. However, we do know that tea-production wages in Fuzhou at the end of the nineteenth century was reported as being daily meals plus 20 *wen* (文) for men and ten *wen* for women per day.⁵⁶

Somewhat better information on wages for second-stage tea processing emerged in the early Japanese reports, though none of these sources provides complete data nor any wage information for the pre-1895 period. The post-1895 wage data we were able to collect can be found in a table entitled “Wages for Various Types of Tea Laborers in Dadaocheng” given below in the Appendices to this article. Without more information from the historical sources, it is impossible

⁵⁴ Walter Lay, “Tamsui Trade Report for 1880 (22 Feb. 1881),” *Reports on Trade at the Treaty Ports, for the Year 1880* (Shanghai: Statistical Department of the Inspectorate General, 1881), p. 192.

⁵⁵ W. Holland, Acting-consul, Tamsui, 10 April 1891, “Report on the Trade of Tamsui and Kelung for 1890,” in British Foreign Office Compiled and ed., *British Parliamentary Papers* (London: Harrison and Sons, 1891), Annual Series, No. 920, Diplomatic and Consular Reports on Trade and Finance, China, Report for the Year 1890 on the Trade of Tamsui, p. 5.

⁵⁶ Liu Chih-yun, “Qing mo bei Taiwan chaye de maoyi (1865-1895),” p. 11.

to estimate whether these late nineteenth-century wages increased over time or whether salary changes occurred in sync with profits made by tea-processing firms or according to labor market developments.

6. Mobilizing Labor to Process Tea in Dadaocheng

Early observers were convinced that tea laborers for the firing process were all migrants from China, because they were “found to be more regular at their work and reliable than those belonging to the town which is close by.”⁵⁷ However, in the trade and customs reports for the nineteenth century, we could find no references to the actual procurement of migrant (or other) laborers required for this work. In his MA thesis, Liu Zhiyun (劉至耘) suggested that compradors were responsible for hiring the tea master(s) and the skilled tea laborers needed by a foreign firm in Dadaocheng.⁵⁸ This was surely the case in the early years of the industry, and it may have continued to be the means by which laborers were hired for British firms throughout the nineteenth century. Witness the rebuke of Walter Lay, blaming his compatriots for their unwillingness to learn local dialects:

Foreigners on the other hand, from ignorance of the language of this country, are quite unable to carry on negotiations themselves with Chinese merchants; but are obliged to resort to their compradors, and to place themselves entirely in the hands of these men. It says much for Chinese honesty that Foreigners have been so successful as they have been.⁵⁹

However, when southern Fujian tea merchants arrived in northern Taiwan on the heels of the British firms in the 1870s, they probably brought experienced tea laborers from their own towns with them. However, if Hobson’s 1876 Tamsui trade report is accurate, “local” (resident Taiwanese) merchants were already involved in the industry.⁶⁰ Would they have preferred migrant laborers from the

⁵⁷ B.W. Bax, *The Eastern Seas: Being a Narrative of the Voyage of H.M.S. “Dwarf” in China, Japan, and Formosa* (London: John Murray, 1875), p. 114.

⁵⁸ Liu Chih-yun, “Qing mo bei Taiwan chaye de maoyi (1865-1895),” p. 54.

⁵⁹ Walter Lay, “Tamsui Trade Report, for the Year 1877 (14 March 1878),” *Reports on Trade at the Treaty Ports in China for the Year 1877* (Shanghai: Statistical Department of the Inspectorate General of Customs, 1878), p. 164.

⁶⁰ H.E. Hobson, “Tamsui Trade Report, for the Year 1876 (31 Jan. 1877),” p. 89.

Xiamen region or could they have relied on growing local familiarity with first-stage processing, some of which could have been transferred to second-stage production?

Early Japanese surveys of the tea industry in the late 1890s frequently refer to arrangements between Dadaocheng tea firm owners and Chinese tea laborers whereby migrants returning to Xiamen after the end of a tea season would sign a contract with their employer for the next year's employment, thereby receiving travel funds and a partial advance.⁶¹ If new laborers were needed from China, it is more likely that tea-processing firm owners (or their compradors) would rely on established relationships with current employees or extant business connections than with the labor recruitment structures established for unskilled laborers migrating to Taiwan or Southeast Asia.

Major changes to the procurement of Chinese migrant laborers occurred in conjunction with the Japanese takeover of the island. Fear of growing lawlessness caused the Japanese authorities to restrict the arrival of migrants from China in late 1895. However, this caused panic among the tea merchants, Chinese, resident Taiwanese and foreign firms, who petitioned the Japanese government to allow tea laborers to continue to work in northern Taiwan during the tea season. Discontent with these travel restrictions, passed on by the British consul in late December 1895 led to temporary permission for previously hired tea laborers to migrate for the 1896 season, but only with assurances from the British consul that companies would take responsibility for these workers.⁶² Then in October of 1897, the Governor-General promulgated a law that formally exempted properly-certified Chinese tea processing laborers from prohibitions on migration from across the Straits.⁶³ However, tea firm owners had to provide detailed information for each migrant laborer (i.e., name, hometown, specific length of intended labor, residence in Taiwan) and obtain a certificate from the Japanese consul in Xiamen.⁶⁴ Subsequent revisions of the law in 1898 added a photograph and more personal

⁶¹ Hara Kishiki, "Cha," pp. 38-39. As these reports are our only source for this arrangement between laborer and tea firm, we don't know when it became a common practice.

⁶² Matsuo Hiroshi, *Taiwan to Shinajin rōdōsha: Migi ni kansuru hitotsu no chōsa hōkokusho*, pp. 3-6.

⁶³ Matsuo Hiroshi, *Taiwan to Shinajin rōdōsha: Migi ni kansuru hitotsu no chōsa hōkokusho*, p. 12.

⁶⁴ Wu Wen-hsing, "Riju shiqi lai Tai Huagong zhi tantao [Examination of Chinese Laborers Migrating to Taiwan during the Japanese Period]," in Chang Yen-hsien, ed., *Zhongguo haiyang fazhanshi lunwenji* [History of Chinese Maritime Development] (Taipei: Zhongyang Yanjiuyuan Sanminzhuyi Yanjiusuo, 1988), vol. 3, p. 163; Matsuo Hiroshi, *Taiwan to Shinajin rōdōsha: Migi ni kansuru hitotsu no chōsa hōkokusho*, p. 12.

information for each migrant's certificate, and the formal Government-General regulation (No. 98, 清國人茶工卷規則) in October of that same year incorporated the Tea Merchants Union's involvement in certifying such laborers, while also attaching a fee for processing the "tea laborer's certificate."⁶⁵ With the promulgation of Government-General law No. 74 (清國勞動者取締規則) in July of 1899, a state-certified recruiter was established for all labor recruited from China, and that recruiter had to provide all of the laborer's personal information previously required when obtaining a labor permit, in addition to establishing a process for giving humanitarian aid to injured or ill workers. Recruiters were required to report laborers' changes of address, including return migration to China. There were strict fines for laborers, recruiters and ship captains who did not follow these regulations.⁶⁶ With this series of restrictions and regulations on tea laborers migrating from China, the colonial Japanese government took control away from tea processing firms as well as the laborers themselves.

7. Conclusions

Given the dearth of details on the laborers who worked in the second-stage processing of tea in Dadaocheng in the nineteenth century, we have turned to the annual tea export statistics, trade and customs reports, early Japanese investigations and photographs to get a better understanding of this very important labor pool. While the main focus of our original research was the pre-1895 growth of tea industry labor, the gendered division of labor and the conditions under which that labor was conducted, our reliance on early Japanese investigations allowed us to expand our statistical analyses into the very first years of the Japanese colonial period.

Customs and trade reports provided reliable annual total tea export figures for the forty-year period of 1865-1905 (see Appendix). Tea export grew from 181,815 pounds in 1865 to 20,589,599 pounds in 1894 and to 23,202,133 pounds in 1905.

⁶⁵ Wu Wen-hsing, "Riju shiqi lai Tai Huagong zhi tantao," pp. 164-165; Matsuo Hiroshi, *Taiwan to Shinajin rōdōsha: Migi ni kansuru hitotsu no chōsa hōkokusho*, pp. 13-15.

⁶⁶ Wu Wen-hsing, "Riju shiqi lai Tai Huagong zhi tantao," p. 166; Matsuo Hiroshi, *Taiwan to Shinajin rōdōsha: Migi ni kansuru hitotsu no chōsa hōkokusho*, p. 19.

Trade and customs reports, supplemented by Japanese investigations published in 1896 and 1905 provided generally reliable figures for the total number of tea-processing firms for seven specific years. If only a handful of foreign firms were involved in the tea industry in the late 1860s and early 1870s, eighty were processing tea in 1884, nearly 100 in 1887, and 125 in 1896. One Japanese survey also claimed that as many as 252 companies located in Dadaocheng were involved in the production, packing and selling of tea.

Using these statistics and additional information from these various reports and investigations, we attempted several estimates of the evolution of the second-stage tea labor, 1865-1903. Plotting total tea processing firms in Dadaocheng against total tea exports produced a rather close correlation between the two (Figure 5). Disaggregating the employee data of Dadaocheng firms from the 31 January 1896 survey (Figure 5), we were able to estimate the total labor employed by tea firms for seven individual years (Figure 7), suggesting a growth from 729-some tea laborers in 1877 to nearly 1,688 in 1895; tea sorters were not included in this estimate. Using the total number of workers (3,356) in the January 1896 survey, together with the total tea export for 1895 (20,201,066 lbs.), we derived a total output to worker ratio and used that to calculate an output-based initial estimate for total annual tea laborers, 1865-1903, again excluding tea sorters and potentially tea chest artisans. This raised the estimate of total annual laborers considerably (Figure 7), from 1,500-plus in 1877 to 3,500-plus in 1902. This estimate did not include tea sorters or tea chest artisans.

Knowing that output-based estimates contain certain disadvantages that diminish their accuracy, especially for the early years of the tea industry, we attempted other estimates, employing information from additional Japanese investigations. Tea sorting laborers and tea chest artisans were added to firm-based data by incorporating information from a Japanese report published in 1896 ("Firm-based combined estimate," Figure 8). Seen from this estimate, the total labor pool grew from 5,481 in 1877 to 12,688 in 1895. With the 1896 report's approximation of total workers (13,200) and the annual tea export for that year (20,201,066 lbs.), we again derived an output per worker ratio and used it to calculate an "Output-based general estimate" of total tea laborers for Dadaocheng firms, 1865-1903 (Figure 8). Seeking an intersection between the precise information in the January 1896 Japanese survey and the more industry-encompassing enumeration from our general estimate (which used data from the 1896 Japanese

report), we derived a slightly lower output to worker ratio (1,407.15 versus 1,530.38) and used that to estimate total tea laborers in Dadaocheng firms, 1865-1903 (“Output-based combined estimate,” Figure 8). This estimate raised the total annual laborers from 6,500 in 1877 to 15,072 in 1896. A third Japanese report produced by the Provisional Committee to Investigate Old Customs, with its 92 total tea processing firms (separated into oolong and baozhong producers) and a smaller number of total tea sorters, gave us one more point from which to estimate total annual workers (“Output-based estimate 1902,” Figure 8). As expected, totals were lower, but perhaps more reliable.

Finally, employing more detailed information on Dadaocheng firms producing baozhong tea from a second 1896 investigation, we calculated estimates of total laborers needed for this segment of the tea industry, 1883-1903 (Figure 9). Comparing these results with the output-based estimate of baozhong firms derived from the 1902 data, shows a fairly close relationship for the years covered by the firm-based estimate (Figure 10), and this grants credence to the use of output-based estimates, while keeping in mind the problems with such estimates, which we have described in detail in the body of the paper.

Assessing wages, working conditions and labor procurement mechanisms for the tea processing industry in nineteenth-century Dadaocheng was much more difficult, as very few contemporary observers or participants provided detailed information. As we expected, female tea sorters received the least amount of pay for their work, although their working conditions were considerably better than male firemen. Tea inspectors were given the highest salary, in keeping with their experience and important role in purchasing, processing and marketing tea. Our limited textual evidence suggests that firemen who attended the stoves in these Dadaocheng firms had the most difficult working conditions and were thus paid a salary much higher than tea sorters. However, one might imagine their work to be far less tedious than sorting tea leaves or picking flowers out of baozhong tea leaves, which was the work reserved for women and girls.

Much future work on this topic needs to be done, and will likely depend on previously undiscovered company reports detailing labor procurement. The major significance of our current research has been summarizing the historical data currently available and attempting to use this data to estimate the evolution of the second-stage tea-processing labor pool in nineteenth-century Dadaocheng.

Appendices

Table 1 Annual Tea Exports, Northern Taiwan, 1865-1905 (in pounds)

Year	Total Tea Exports	Oolong Tea Exports	Baozhong Tea Exports
1865	181,815		
1866	180,824		
1867	270,123		
1868	528,210		
1869	729,234		
1870	1,405,333		
1871	1,982,411		
1872	2,601,801		
1873	2,081,324		
1874	3,281,346		
1875	5,543,140		
1876	7,854,027		
1877	9,230,755		
1878	10,701,524		
1879	11,337,427		
1880	12,063,450		
1881	12,859,467		50,540
1882	12,040,447		
1883	13,206,727		151,620
1884	13,156,581		
1885	16,364,000		
1886	16,171,600		767,410
1887	16,858,933		
1888	18,099,200		
1889	17,432,125		
1890	17,201,666		
1891	18,139,749		
1892	18,228,933		
1893	21,859,867	20,047,200	1,812,667
1894	20,589,599	18,299,333	2,290,266
1895	20,201,066	18,466,250	1,734,816
1896	21,231,301	19,286,281	1,945,020
1897	20,302,590	17,857,438	2,445,152
1898	20,126,816	17,422,631	2,704,185
1899	19,837,331	16,919,054	2,918,277
1900	19,416,138	16,112,641	3,303,497
1901	19,337,269	16,417,041	2,920,228
1902	21,267,090	18,599,532	2,667,558
1903	23,680,185	20,415,662	3,264,523
1904	21,984,369	18,656,161	3,328,208
1905	23,202,133	19,255,156	3,946,977

Sources: Annual Customs Reports, published by the Imperial Maritime Customs Statistical Department, and Annual Trade Reports compiled by British consular officials in Tamsui and published in the *British Parliamentary Papers*; figures in red were calculated from amounts given in *dan* or *jin*.

Table 2 Wages for Various Types of Tea Laborers in Dadaocheng

Laborer Type	Wages & Expenses 1896 ⁶⁷	Wages 1902	Wages 1902-3 ⁶⁸	Wages 1903	Wages 1902-3 ⁶⁹
Tea inspector 茶鑑定者	200-300 <i>yuan</i> 圓; 7-8 mo. each year; housing, meals & travel expenses paid by employer				
Oolong tea master 番莊茶 師 (烏龍茶鑑 定人)					500 <i>yuan</i> 圓 (top), 300 <i>yuan</i> (medium), 200 <i>yuan</i> (lower); 7-8 mo. each year
Baozhong tea master 舖家茶 師 (包種茶鑑 定人)					600 <i>yuan</i> 圓 (top), 400 <i>yuan</i> (medium), 300 <i>yuan</i> (lower); 7-8 mo. each year
Tea packer 製 茶勞動人	40-50 <i>yuan</i> 圓; 7- 8 mo. each year; housing, meals & travel expenses paid by employer		Regular wages 30 <i>yuan</i> 圓; top wages 70 <i>yuan</i> ; 7- 8 mo. each year		60 <i>yuan</i> 圓 (top), 40 <i>yuan</i> (medium), 30 <i>yuan</i> (lower), 7- 8 mo. each year
Tea chest carpenter 箱製 造人	1 <i>yuan</i> 圓 & 10 <i>qian</i> 錢 for building 100 chests; skilled carpenter can craft 40 chests per day; housing, meals & travel expenses paid by employer		Daily wage: 44 <i>qian</i> 錢 (building 40 chests)		
Tea chest liner artisan 鉛葉製 作人	6 <i>yuan</i> 圓 & 60 <i>qian</i> 錢 for making 20 liners; skilled artisan can make 20 liners each day; housing, meals & travel		Daily wage: 1 <i>yuan</i> 圓 & 32 <i>qian</i> 錢 (making 20 liners)		

⁶⁷ Hara Kishiki, "Cha," pp. 38-40.

⁶⁸ Rinji Taiwan Kyūkan Chōsakai, Dai Nibu, "Cha sangyō," pp. 89, 97, 99, 105.

⁶⁹ Rinji Taiwan Kyūkan Chōsakai, Dai Nibu, "Chagyō rōdōsha jōkyō [Tea Industry Labor Conditions]," *Rinji Taiwan kyūkan chōsakai dai nibu, Chōsa keizai shiryō hōkoku* [Report of the Investigation of the Economy, Second Division of the Provisional Committee for the Investigation of Taiwan Old Customs] (Taihoku: Rinji Taiwan kyūkan chōsakai dai nibu, 1905), vol. 2, pp. 488-489. To reserve a tea-sorting woman's labor for the next year, it was customary for the firm to extend an advance of 20% of the next year's estimated wages to the woman.

	expenses paid by employer				
Tea chest label artisan 箱紙貼付人	1 <i>yuan</i> & 10 <i>qian</i> for labeling 100 chests; capable artisan can label 40 chests per day; housing, meals & travel expenses paid by employer				
Chest design artist 畫手	2 <i>yuan</i> for painting designs on 100 chests; skilled artists can paint 50 chests per day; housing, meals & travel expenses paid by employer				
Tea sorter (women and girls) 揀茶女工	Daily wage: 10 <i>qian</i> 錢; good leaves 1 <i>jin</i> 斤; poor leaves 3-4 <i>jin</i>	Piece work: 5 <i>qian</i> 錢 for sorting 7 <i>jin</i> ⁷⁰	Piece work: 4 <i>qian</i> 錢 for sorting 10 pounds; Daily wage: regular: 10 <i>qian</i> ; nimble hand: 25 <i>qian</i>	Daily wage: from 4-5 <i>qian</i> 錢 to 15-16 <i>qian</i> ⁷¹	Daily wage: 20 <i>qian</i> 錢 (top), 12 <i>qian</i> (medium), 8 <i>qian</i> (lower); normal wage 13-14 <i>qian</i> per day

⁷⁰ James Davidson, *The Island of Formosa, Past and Present*, p. 385.

⁷¹ Magozō Sakura, "Xuan chafu [Tea-picking Women]," in Taiwan Yinhang Jingji Yanjiushi, ed., *Tai feng zaji* [Miscellany of Taiwan Customs] (Taipei: Taiwan Yinhang Jingji Yanjiushi, 1961, c1903), p. 19.

References

- “Formosa: Nineteenth Century Images,” accessed 15 July 2020; available from <https://rdc.reed.edu/c/formosa/home>.
- “Taihokuken Naimubu Shokusanka kenfu kyū Tansuiken Taihokushi chagyō meisaisatsu 〈臺北縣內務部殖產課檢附舊淡水縣臺北市茶業明細冊〉 [Detailed Listing of the Tea Industry in Taihoku City, former Tamsui District, Investigated by the Reproductive Industries Department, Internal Affairs Division, Taihoku Prefecture] (31 Jan. 1896).”
- Baber, E. Colborne
- 1873 “Report on Foreign Trade at Tamsuy (Including Kelung) for the Year 1872.” In British Foreign Office Compiled and ed., *British Parliamentary Papers*, China. No. 3 (1873), Part II, Commercial Reports from Her Majesty’s Consuls in China, 1872, pp. 197-211. London: Harrison and Sons.
- Bax, B.W.
- 1875 *The Eastern Seas: Being a Narrative of the Voyage of H.M.S. “Dwarf” in China, Japan, and Formosa*. London: John Murray.
- Chalmers, J.L.
- 1889 “Tamsui (26 Oct. 1887).” *Tea, 1888*, pp. 88-91. Shanghai: Statistical Department of the Inspectorate General of Customs.
- Chen, Chih-hao, Kuan-fei Chen and Kai-wen Chen 陳志豪、陳冠妃、陳凱雯
- 2018 “107-nian weituo banli Yangmingshan Guojia Gongyuan Rizhi shidai chachanye diaocha yanjiu 〈107年委託辦理陽明山國家公園日治時代茶產業調查研究〉 [Investigation and Research on the Tea Industry in Yangmingshan during the Japanese Occupation, Commissioned in 2018]. Yangmingshan Guojia Gongyuan Guanlichu weituo yanjiu baogao 陽明山國家公園管理處委託研究報告 [Research report commissioned by the Yangmingshan National Park Management Office].
- Chiu, Hsien-ming 邱顯明
- 2004 “Rizhi shiqi Taiwan chaye gailiang zhi yanjiu 〈日治時期臺灣茶業改良之研究〉 [Research on the Improvement of the Tea Industry in Taiwan during the Japanese Colonial Period].” Master’s Thesis, National Central University.
- Davidson, James
- 1903 *The Island of Formosa, Past and Present History, People, Resources, and Commercial Prospects--Tea, Camphor, Sugar, Gold, Coal, Sulphur, Economical Plants, and other Productions*. New York: Macmillan & Co..
- de Galembert, P.M.G.
- 1905 “Amoy Trade Report, for the Year 1904.” *Returns of Trade and Trade Reports for the Year 1904*, vol. 2, pp. 648-679. Shanghai: Statistical Department of the Inspectorate General of Customs.
- Dodd, John
- 1888 *Journal of a Blockaded Resident in North Formosa: During the Franco-Chinese War, 1884-5*. Hongkong: “Daily Press” Office.

Farago, E.

- 1885 “Tamsui Trade Report for the Year 1884 (24 Jan. 1885).” *Reports on Trade at the Treaty Ports in China for the Year 1884*, pp. 257-272. Shanghai: Statistical Department of the Inspectorate General of Customs.

Fix, Douglas 費德廉

- 2018 “Xiamen: Emigrants’ Portal to a Broader World.” Center for Chinese Studies Research Working Paper.

Ford, Colin M.

- 1880 “Report on the Foreign Trade of the Ports of Tamsuy and Kelung During the Year 1879 (26 Feb. 1880).” In British Foreign Office Complied and ed., *British Parliamentary Papers*, China. No. 3 (1880), Commercial Reports from Her Majesty’s Consuls in China, 1879, pp. 235-249. London: Harrison and Sons.

Greedy, Edward

- 1871 “‘Taiwan’: Formosa.” *Frank Leslie’s Illustrated Newspaper* (New York) 33(384): 28-29.

Gregory, William

- 1872 “Notes by Acting Consul Gregory on the Tamsuy Report and Returns for 1871.” In British Foreign Office Complied and ed., *British Parliamentary Papers*, China. No. 2 (1872), Commercial Reports from Her Majesty’s Consuls in China, 1871. pp. 138-139. London: Harrison and Sons.

Hara, Kishiki 原熙識

- 1896 “Cha 〈茶〉 [Tea].” In Taiwan Sōtokufu Minseikyoku Shokusanbu, ed., *Taiwan sangyō chōsaroku* 《臺灣產業調查錄》 [Record of the Investigation of Taiwan Industries], pp. 1-75. Taihoku: Taiwan Sōtokufu Minseikyoku Shokusanbu.

Hobson, H.E.

- 1877 “Tamsui Trade Report, for the Year 1876 (31 Jan. 1877).” *Reports on Trade at the Treaty Ports in China for the Year 1876*, pp. 85-95. Shanghai: Statistical Department of the Inspectorate General of Customs.

Holland, W.

- 1891 “Report on the Trade of Tamsui and Kelung for 1890.” In British Foreign Office Complied and ed., *British Parliamentary Papers*, Annual Series, No. 920, Diplomatic and Consular Reports on Trade and Finance, China, Report for the Year 1890 on the Trade of Tamsui, pp. 1-7. London: Harrison and Sons.

Hosie, Alex

- 1893 “Report by Mr. Hosie on the Island of Formosa with Special Reference to Its Resources and Trade.” In British Foreign Office Complied and ed., *British Parliamentary Papers*, Commercial. No. 11 (1893), pp. 2-25. London: Harrison and Sons.

Hsu, Hsien-yao 許賢瑤

- 2005 *Taiwan baozhongcha lunji* 《臺灣包種茶論集》 [Anthology of Articles Concerning Taiwan Baozhong Tea]. Taipei: Lexue Shuju.

Katō, Hisae 加藤久衛

- 1924 “Taihokushū shita no kōbana sakumotsu I 〈臺北州下の香花作物（一）〉 [Fragrant Flower Materials in Taihoku District I].” *Taiwan Nōjihō* 《臺灣農事報》 (Taihoku) 207: 39-47.

Kawarabayashi, Naoto 河原林直人

- 2003 *Kindai Ajia to Taiwan: Taiwan chagyō no rekishiteki tenkai* 《近代アジアと台湾：台湾茶業の歴史的展開》 [Modern Asia and Taiwan: The Historical Development of the Tea Industry in Taiwan]. Kyōto: Sekai Shisōsha.

Lay, Walter

- 1878 “Tamsui Trade Report, for the Year 1877 (14 March 1878).” *Reports on Trade at the Treaty Ports in China for the Year 1877*, pp. 161-172. Shanghai: Statistical Department of the Inspectorate General of Customs.

- 1881 “Tamsui Trade Report for 1880 (22 Feb. 1881).” *Reports on Trade at the Treaty Ports, for the Year 1880*, pp. 187-199. Shanghai: Statistical Department of the Inspectorate General.

Lin, Man-houng 林滿紅

- 1997 *Cha, tang, zhangnaoye yu Taiwan zhi shehui jingji bianqian, 1860-1895* 《茶、糖、樟腦業與臺灣之社會經濟變遷，1860-1895》 [Tea, Sugar, and Camphor Industries and the Socioeconomic Development of Taiwan, 1860-1895]. Taipei: Lian Jing.

Liu, Chih-yun 劉至耘

- 2006 “Qing mo bei Taiwan chaye de maoyi (1865-1895) 〈清末北臺灣茶葉的貿易（1865-1895）〉 [Tea Trade in Northern Taiwan during the Late Qing Period (1865-1895)].” Master’s Thesis, National Chi Nan University.

Matsuo Hiroshi 松尾弘 (ed.)

- 1937 *Taiwan to Shinajin rōdōsha: Migi ni kansuru hitotsu no chōsa hōkokusho* 《臺灣と支那人労働者（右に關する一つの調査報告書）》 [Taiwan and Chinese Laborers (An Investigative Report Concerning These Laborers)]. Taihoku: Nanshi Nanyō Keizai Kenkyūkai.

Morrison, G. James

- 1877 “A Description of the Island of Formosa, with Some Remarks on Its Past History, Its Present Condition, and Its Future Prospects.” *The Geographical Magazine* (London) 4: 260-266, 293-296, 319-322.

Morse, H.B.

- 1893 “Tamsui Trade Report for the Year 1892 (14 Jan. 1893).” *Reports on Trade at the Treaty Ports in China for the Year 1892*, pp. 339-358. Shanghai: Statistical Department of the Inspectorate General of Customs.

- 1895 “Tamsui Trade Returns for the Year 1894.” *Returns of Trade and Trade Reports for the Year 1894*, pp. 361-379. Shanghai: Statistical Department of the Inspectorate General of Customs.

Price, George Uvedale

- 1895 *Reminiscences of North Formosa*. Yokohama: Kelly & Walsh.

Rinji Taiwan Kyūkan Chōsakai, Dai Nibu 臨時臺灣舊慣調查會第二部

- 1905 “Cha sangyō 〈茶產業〉 [Tea Industry].” In Rinji Taiwan Kyūkan Chōsakai, ed., *Rinji Taiwan kyūkan chōsakai dai nibu, Chōsa keizai shiryō hōkoku* 《臨時臺灣舊慣調查會第二部調查經濟資料報告》

- [Report of the Investigation of the Economy, Second Division of the Provisional Committee for the Investigation of Taiwan Old Customs], vol. 1, pp. 49-124. Taihoku: Rinji Taiwan kyūkan chōsakai dai nibu.
- 1905 “Chagyō rōdōsha jōkyō 〈茶業勞働者狀況〉 [Tea Industry Labor Conditions].” In Rinji Taiwan Kyūkan Chōsakai, ed., *Rinji Taiwan kyūkan chōsakai dai nibu, Chōsa keizai shiryō hōkoku* [Report of the Investigation of the Economy, Second Division of the Provisional Committee for the Investigation of Taiwan Old Customs], vol. 2, pp. 487-489. Taihoku: Rinji Taiwan kyūkan chōsakai dai nibu.
- Sakura, Magozō 佐倉孫三
- 1961[1903] “Xuan chafu 〈選茶婦〉 [Tea-picking Women].” In Taiwan Yinhang Jingji Yanjiushi, ed., *Tai feng zaji 《臺風雜記》* [Miscellany of Taiwan Customs], p. 19. Taipei: Taiwan Yinhang Jingji Yanjiushi.
- Scott, B.C.
- 1878 “Report on the Trade of the Ports of Tamsui and Kelung for the Year 1877 (27 March 1878).” In British Foreign Office Compiled and ed., *British Parliamentary Papers, China. No. 7 (1878), Commercial Reports by Her Majesty’s Consuls in China, 1877*, pp. 138-154. London: Harrison and Sons.
- Steere, Joseph
- 1873 “First Letter from Formosa.” *Ann Arbor Courier* (Ann Arbor) LXXII.
- Taiwan Sōtokufu Minseikyoku Shokusanbu 臺灣總督府民政局殖產部 (ed.)
- 1898 “Taiwan hōshucha 〈臺灣包種茶〉 [Taiwan Baozhong Tea].” In Taiwan Sōtokufu Minseikyoku Shokusanbu, ed., *Taiwan Sōtokufu Minseikyoku Shokusan hōbun (Nōgo no bu) 《臺灣總督府民政局殖產報文(農業之部)》* [Report on Industry by the Civil Affairs Bureau of the Taiwan Government General (Section on Agricultural Industries)], vol. 1, pp.13-19. Taipei: Taiwan Sōtokufu Minseikyoku Shokusanbu.
- Wu, Wen-hsing 吳文星
- 1988 “Riju shiqi lai Tai Huagong zhi tantao 〈日據時期來臺華工之探討〉 [Examination of Chinese Laborers Migrating to Taiwan during the Japanese Period].” In Yen-hsien Chang, ed., *Zhongguo haiyang fazhanshi lunwenji 《中國海洋發展史論文集》* [History of Chinese Maritime Development], vol. 3, pp. 157-189. Taipei: Zhongyang Yanjiuyuan Sanminzhuyi Yanjiusuo.
- Xu, Yingxiang 徐英祥 (ed.)
- 1995 *Taiwan Riju shiqi chaye wenxian yiji 《臺灣日據時期茶業文獻譯集》* [Anthology of Translated Documents Concerning the Taiwan Tea Industry Under Japanese Rule]. Taipei: Taiwansheng Chaye Gailiangchang.
- Zeng, Naishuo 曾迺碩
- 1957 “Qingji Dadaocheng zhi chaye 〈清季大稻埕之茶業〉 [Tea Industry in Daodaocheng during the Qing Period].” *Taipei Wenwu 《臺北文物》* (Taipei) 5(4): 99-117.

動員男女來生產臺灣茶

費德廉、謝政軒

摘 要

本文引用歷年的海關報告、駐淡水港英國領事的貿易報告、早期日本殖民官員所進行的調查以及外國攝影師所照的圖像等資料來研究十九世紀大稻埕第二階段茶葉加工企業的茶館所僱用勞動力的演變。茶館總數、年度茶葉（烏龍茶和包種茶）出口統計以及茶館僱用員工人數都用來估計勞動力所需的演變。同時本文也探討茶葉工作的性別劃分，評估不同勞動任務的工作環境，並總結有關工資的歷史數據。

關鍵詞：十九世紀、茶業勞工、烏龍茶、包種茶、臺灣