TEA PRODUCTION IN SOUTH CAROLINA

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Tea has been grown in the southeastern United States for over 200 years, but commercial success has, until recently, eluded a succession of plantation entrepreneurs despite the favorable physical setting. The labor-intensive nature of tea cultivation and processing, combined with poor transportation access for market distribution from the South, required a daunting creativity. Technological innovations by individual owners, and integration of this region into national and global production chains, hold promise for the long-elusive addition of a popular crop to the list of Southern agricultural outputs.

Although numerous studies of low-country Southern agriculture have traced the cyclical fortunes of traditional crops such as cotton (Kovacik and Mason, 1985), tobacco, rice (Wilms 1972), and indigo (Winberrry, 1979), a gap remains by the omission of a treatment of tea. Orange pekoe and pekoe black are produced on Wadmalaw Island’s Charleston Tea Plantation, the only commercially cultivated tea in the Americas. This research traces the historical and contemporary cultivation of tea in South Carolina, highlighting the human challenges to its commercial production. The paper first outlines different types of tea plants and their physical requirements. The next section briefly traces growth in the global consumption of and trade in tea, followed by a look at uses for “tea” by North American natives. The main body of the paper relates the history of experiments in commercial tea production in South Carolina, concluding with reasons for the current success in handling the persistent underlying problem of labor cost.

BACKGROUND. The place of origin for tea (Camellia sinensis [L.] O. Kuntze) is an area stretching from the Assam-Burma hill region east to China’s coastal Zhejiang Province and south to Vietnam and the hill country of Burma and Thailand. The three main types of tea bushes are Chinese (sinensis), Assamese (assamica), and Cambodian (camboed), with numerous hybrids of each type (Eden, 1976). Cultivated varieties of tea are known as cultivars, with the Assam varieties proving most adaptable to variability in growing conditions. The Chinese type is now crossed with the other two, which are crossed with each other as well. Black tea leaves, as distinguished from green, are produced by allowing the plucked leaf to wilt, distort and dry, causing oxidation. Most tea consumed outside the Orient is a form of black tea. Tea is intensively cultivated as a bush, although the plant grows naturally as a tree, and can reach heights of 30 feet. For the convenience of leaf pickers, tea bushes are usually trimmed to approximately five feet high.

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Types of tea plants exhibit distinct leaf shapes and sizes. Chinese bushes have relatively small (2 inches in length), stiff leaves with no prominent apex or veins. This type is prevalent in Japan and East and Southeast China. One variant is the "big-leaved China," with leaves up to 5 1/2 inches in length on a tree growing up to 16 feet in height. The second major type is a tree 15 to 30 feet high, with light colored leaves up to 6 1/2 inches in length, a continuous apex, and 10 pairs of veins. It grows from Assam throughout Southeast Asia. The last variety is a tree found throughout India. Growing up to 60 feet high, it produces thin and flabby leaves from 8 to 14 inches in length, with 12 to 15 pairs of prominent veins on a wrinkly leaf surface. The apex is long and sharply defined.

Climate, soil, and labor are the three major factors of production. The basic climatic requirement is warmth and moisture, particularly when coupled with a monsoon cool, less wet winter. Transpiration factors affecting tea production vary by altitude, temperature range, angle of hillside, presence of a windbreak, rain shadow (lee) versus windward side, and frequency and amount of rain during the cool or relatively dry season. A difference in the annual range of daily temperature average of more than 20 degrees Fahrenheit retards growth greatly in the cooler season by interrupting the "flushing," or blooming, of the plant. A secondary cause for interrupted flushing is a decrease in precipitation. Production of flavor in tea leaves varies with altitude (increasing altitude leading to increase in root carbohydrates) and ultraviolet light, with the pause of a cool season considered desirable. South Carolina's climate is relatively dry for tea cultivation, compared to the tea homelands of India and China.

Tea is highly adaptable to a wide variety of soils, but does best on a medium or light loam. Since it will grow on hillsides shunned by other plants, it is a prime crop for marginal land. Tea plants grow poorly on limestone or alkaline land, although acidity of tea soils varies from a pH of 4.0 to 6.5. Most tea soils are acidic laterite soils, the end result of the leaching process in warm climates with heavy rainfall. Nitrogen content in tea-growing soil varies greatly, further complicating attempts to classify suitable soil (Eden, 1976). Well-drained and permeable soil is needed for the tender tea roots. Reddish soil, indicating a high presence of iron oxide, also is desirable. The three requirements of soil preparation are protection from erosion, deep cultivation, and shade (Eden, 1976). The third consideration for successful tea growing is a sufficiently large labor force—hence the plantation setting for much commercial tea propagation. Indian plantations at the turn of the century are estimated to have had 1.5 workers per acre (Harler, 1966). Bushes were plucked four to five times per year, pruned, replanted, fertilized, and treated with pesticide.

According to folk stories, tea is reputed to have entered southern China from the border with India and Burma around the fifth century A.D. (Schafer, 1962). Adoption of a new plant coincided with the disunity following the fall of the Han Dynasty. Openness to innovations from the West would have allowed Buddhist monks to introduce both a new faith and a new plant. Tea was planted during the
Western Han Dynasty (206 B.C. to 9 A.D.) (Zhao, 1994) and taken to Japan about 800 A.D. The first Chinese popularization of tea was sparked by Lu Yu's *Tea Classic (Cha Ching)* in the eighth century (Anderson, 1988). The T'ang Dynasty (A.D. 618 to 907) government recognized tea's enduring popularity by making it a state monopoly and the subject of heavy taxation in 793 A.D. (Huxley, 1956). A phrase still repeated today came from the succeeding Sung dynasty: "The things that people cannot do without every day are firewood, rice, oil, salt, soybean sauce, vinegar, and tea." Relatively expensive and rare, tea became the subject of dilettantes and agriculturists. By the end of the Ming Dynasty in 1611, tea had achieved the widespread stature and availability it enjoys today.

The dialect of the port of origin reveals in which area of China the tea was grown. The Persian, Mongol, Russian, and Eastern European word "cha" resembles the northern Chinese Mandarin dialect "cha." Western European words like "tea" come from the southern Chinese dialect's "te." Over 60% of China's tea is grown in Fujian, Zhejiang, Hunan, Sichuan, and Anhui provinces, where it is pronounced "te."

**THE TEA TRADE AND TEA INDUSTRY.** Trade in tea falls into several distinct phases. The first began with Dutch export to Europe in 1610, in exchange with the Chinese for dried sage. The East India Company received a charter for the tea trade "into the East Indies" in 1600. Tea was introduced to England around 1645 and sold publicly in 1657. In 1742 Scottish papers complained that "even the meanest families" were forsaking ale for tea at breakfast (Huxley, 1956). Tax by Parliament was first levied in 1660 (Harler, 1956). "John Company" held a monopoly on trade in tea with China from 1715-1833, when Earl Grey's Act rescinded the exclusivity. In 1858 the Company's interests in India reverted to the British government, following the Indian Mutiny in 1855. Tea trade with China reached its early height in 1888. Impacts of tea trade on the American colonies began with the Stamp Act in 1765, with taxes subsequently removed in response to American protests on all but tea—in deference to the financing of the British government by the East India Company.

A second phase is associated with the spread of tea production. Java began production in 1825, and India commenced operations for the commercial cultivation of export tea in 1833. Ceylon was added as a site in 1875, and Sumatra around 1910. Natal signaled Africa's entry into the commercial production field in 1887. Eastern Africa, in particular former British colonies, was active in tea production by the early 1950s. Georgia (former USSR) grew thousands of acres. Brazil's seed came from Japan, and Australia's from Indonesia (Harler, 1966). Although the original tea-cultivating lands of India and China still produce most of the tea grown today, many countries impacted by colonial plantation agriculture and coffee cultivation also produce some tea (Fig. 1). The amount of United States output is suppressed, in accordance with standard production reporting practice, since only one company is involved.
TEA CULTIVATION IN NORTH AMERICA. The first North American “tea” was probably brewed from the leaves of *lex vomitus*, or the yaupon holly, a plant native to what is now the southeastern United States. The native Americans of the area considered “the black drink” a sacramental substance, whose consumption was reserved for particularly solemn occasions (Hudson, 1979). In the early 1920s, yaupon was grown experimentally as a possible competitor to tea and coffee. It was noted that the “black cassina” was the basis of a “common tea of Sea Island negroes” (Rice, 1923, p. 53). A hardy bush growing 6 to 23 feet high, it was particularly popular as a windbreak hedge. An Oregon farm is attempting to devise a tea plant resistant to freezing temperatures, and commercial explorations in tea cultivation are underway on one of the Hawaiian Islands, but Charleston, South Carolina still can claim “The Only Tea Grown in [North] America” (pers. comm., US Tea Association).

TEA IN SOUTH CAROLINA. With the exception of a brief period from 1848 to 1852, tea plants have been grown on the coastal plains of South Carolina (Fig. 2). Coastal plain soils are “unconsolidated, water-laid beds of sands and clays up to 20 feet thick, overlaying thick beds of soft marl” composed of clay and calcium carbonate, or crumbly green sand and loam useful as fertilizer (Adams and Trinkle, 1991, p. 7). The average growing season on South Carolina’s coastal plain is 266 days (tea requires six months), with annual rainfall averaging 49.1 inches. Charleston County contains 17 different soil types, including Wadmalaw Island’s fine sandy loam. An oak-hickory-pine forest region of broadleaf, deciduous, and needle-leaf evergreen trees prevails, the dominant understory of which is yaupon holly. Rice has been grown since 1690 in the inland swamp and tidal zone, alternating with indigo and cotton on the Sea Islands. Slaves were used extensively to cultivate these crops. Wadmalaw Island soil is 88 to 99% sand, with 1 to 2% organic matter, over heavy clay. In order to maintain a pH in the 4.8 to 5.3 range preferred by tea, a nitrogen source such as a common nitrate was added to improve absorption of minor soil elements.

The first *Camellia sinensis* tea plant in the United States reportedly was planted along with a *C. japonica* by the French botanist André Michaux sometime between 1799 and 1802 at Middleton Barony on the Ashley River. Michaux was hired by the French government to export plants to France from the United States. At Middleton Place (a landscaped garden since 1741) the tea plant grew to a height of 15 feet. Because of what was diagnosed as “inadequate rolling of the leaf” (Shepard, 1894, p. 2), the infusion was not strong enough for contemporary tastes more accustomed to a low-grade brew.

Interestingly, however, in a letter dated February 17, 1779, Charlestonian Mathew Irwin directed a merchant on the loading of “rice, tea, sugar [crossed out], and oranges.” The merchant is cautioned, in the throes of the Revolutionary War, to inquire ahead of time in case “Charles Town [is] taken before you arrive.”
earliest direct mention implies that tea and rice already were being grown in the rebellious colony. In the late 18th century a portion of Charleston County is shown on property maps as the "Tyler Tea Farm," near slave settlements cultivating rice in the area (Adams and Trinkle, 1991).

An article in the first volume of the Southern Agriculturist (1828) quoted extensively from "Barrow's Travels in South Africa," remarking on the similar latitude (reversed) and climate of regions in China and that country—as well as Charleston—where the tea plant proved hardy. The Editor of the Agriculturist noted that such tea plants had been raised since 1813 at Monsieur Noisette's Nursery near Charleston. He eagerly added that this "might become a great staple of South Carolina" (Legare, 1828, p. 18). The same volume carried a letter from William Prince, proprietor of the Limean Botanic Garden in New York, offering to send some of his "Green and Bohemian Tea plants, good established ones." Prince noted that the tea plant was harder than the gardenia that already grew outdoors around Charleston (Legare, 1928, p. 350).
Dr. Junius Smith, a retired London businessman (Watson, 1907), experimented with cultivating tea on an estate near Greenville, South Carolina, from 1848 until his death in 1852 (News & Courier, 1905; Hamrick, 1972). In the late 1850s, the U.S. government collected Asian tea seeds and widely distributed them throughout the South Atlantic and Gulf States. The resulting gardens were too small to be of commercial value, but bushes did produce in sufficient strength to revive federal interest. An attempt by Dr. Alexis Forster to grow tea near Georgetown, South Carolina, in 1874 also ceased with his death five years later. By then the United States imported almost one million pounds annually—one-sixth that of Britain.

In 1888 the National Department of Agriculture investigated producing tea on a commercial scale. John Jackson, an experienced tea planter in India, was employed to cultivate tea planted 30 years earlier in Liberty County, Georgia. When this proved unsuccessful, some 200 acres of land near Summerville, South Carolina, were leased for an experimental station, using seeds from China, India, and Japan. A change of commissioners in 1884 resulted in a report faulting the climate as unsuitable, so the experimenters at Newington Plantation in the Summerville area abandoned the attempt.

Congress later appropriated $10,000 for an experimental tea farm about 30 miles west of Charleston in Summerville. The United States Department of Agriculture purchased tea seed in Asia for Pinehurst Plantation, located just one mile from the previously terminated effort, and received Patent Office permission to experiment with plants left at the older government station. The plantation was sold to Charles Shepard after seven years of heavy federal subsidies. He planted 90 acres of tea, which flourished until his death in 1915. A report in the 1887 New York Times credited annual production at 12,000 pounds. The progenitors of these ultimately successful tea plants were an Assam hybrid, mixed with a type from China, following 30 years of growth in England. The most illustrious tea seed came from Hangchow’s renowned “Dragon’s Pool” estate, whose tea was extremely expensive. Varieties grown in Summerville included Darjeeling from the Himalayas and a Japanese variety.

The Carolina tea plants were raised on a variety of soils: “under-drained pond and high swamp, the slope of a clay hill, and a flat, sandy pineland” (Foreign Office, 1894, p. 3). The soil was basically a clay loam, over stiff clay subsoil, or black piney-wood pond soil over quicksand and clay (Shepard, 1899)—clearly marginal land. The dense shrub forest was leveled, burnt marl added at the rate of one ton per acre, and the land plowed, irrigated, and drained. Water needs were estimated at 13 gallons per week per plant, with an acre requiring four-fifths of an inch per week. Lack of a perceptible difference in quality of leaf from one area to another was attributed to all-around heavy manuring.

By 1893 the Pinehurst plants were sufficiently established for the first leaf plucking. In his report the U.S. Secretary of Agriculture declared that he was very pleased with the “very excellent English breakfast tea.” Brought to Baltimore from...
Summerville, the leaves were a "rather small even blackish leaf with Pekoe flavor" (Shepard, 1894, p. 53). Two distinct seasons in the Charleston area led to differences in astringency: the mild spring and the strong autumn. A severe freeze in 1899 failed to fatally damage the crop, which fortunately was covered by five inches of snow. The resultant heavy pruning, similar to the typical five-year prune in India and Ceylon, led to luxuriant regrowth.

The yield overall was less than a similar acreage in Asia because of a characteristic American attempt to use technology to counter higher labor costs. Planters set out the bushes at greater distances from each other than was the case in Asia, trying to use cultivators and mule-drawn ploughs rather than the spade and manual labor. By this method they were able to produce 37 ½ lbs. of leaf in the third year. It was expected the yield would increase to 40 pounds in a year, then 160 lbs. in the next year, double the following year, and double again by the fifth year. In general, Chinese tea was hand-manipulated, whereas British (and under their influence, Indian) tea was machine processed. The ideal was to move from bush to box by machine.

Another novel method was employed to deal with the same cost problem. To secure relatively cheap, reliable labor, Shepard built a schoolhouse on his plantation and hired a (Black female) teacher. Local "negroes" were invited to send their...
children to school for free—with money for food and clothing earned by picking tea. Bushes were kept thick and low to meet height requirements for the pickers, chosen from available pupils. According to Shepard, these were "a carefully trained and well-superintended corps of colored children, who show great aptitude in this direction" (Fig. 3). The tall trees surrounding the field as a windbreak look much as they do today, but the shape and spacing of the tea bushes have changed—with enormous consequences discussed later.

Wages were represented as comparable to those "in cotton, corn, or pea fields." Shepard observed that "the population seems to be increasing more rapidly than the means of employment and sustenance—many must be idle unless new industries are provided" (Shepard, 1898, p. 23). An average pick was two pounds of green leaf per hour, at 6 cents per pound. This represented less than half of the estimated total per pound cost of 16 cents. Pinehurst black tea retailed at $1/lb., or half the cost of the imported leaf. Produced on a large scale, tea was expected to yield $40/acre from 400 lbs. of tea (News & Courier, 1905). Shepard also "evolved valuable machinery for making the tea ready for market" (Watson, 1907, p. 326).

Steps in the cycle of growing and processing tea leaves at the turn of the century were carefully documented and photographed. Autumn seed was gathered and protected in a nursery. Soil was recommended to be thin and light, with a hard subsoil, and near a spring. Seed was planted 2 to 3 inches deep, 3 inches apart, in rows 4 inches apart and covered with pine straw. By midsummer, when the seedlings were 4 to 6 inches high, they were ready to transplant. Tall trees provided a permanent windbreak. Infilling of unsuccessful plants was done quickly, as tea plants prefer dense conditions. Picking in season occurred once every 10 days, taking three days for 20 children to finish. Cowpeas were sown in the rows between plants in the autumn.

Following picking by children, adult males brought large, sturdy woven bags full of leaves from the field into a "withering" or drying loft that produced a maximum 50 lbs. of dry tea per day. One pound of tea needed 40 square feet of withering space. Further drying took place on trays of cloth that moved above blow dryers to cooler space. Leaves were then taken to the rolling machine on a lower floor. Next they were separated, picked over, and exposed for oxidation. After further firing in dryers, they were weighed, boxed, and shipped. One pound of dry leaf took 4½ pounds of fresh leaf.

A major problem cited by Shepard in selling his tea was the cost of transportation. Domestic shipping rates made it cheaper for Chicagoans, for example, to buy tea from China than from Carolina. Since it was not possible to compete on price with tea from the East, Pinehurst's niche was to pitch "distinctive cup qualities" and attempt to alert "a tea drinking people to a realization of the danger which lurks in a cup of trashy tea." Novel Pinehurst products from this period included a match-box size compressed "tea-tablet" pellet. It was made from ground tea dust, rather than the adulterated Chinese tea bricks. A "shelter" tea was produced from leaves...
covered by matting which created tender blue leaves. Shepard’s efforts culminated with top honors for his Formosa oolong tea at the St. Louis World Fair in 1904 (Wilson, 1907; Miller, 1994). The fate of tea growing in South Carolina fluctuated throughout the 20th century.² In 1901, the American Tea Growing Company was chartered by partners Major Roswell Trimble (a student of Dr. Shepard) and Augustus Tyler to grow tea in Rantowles, South Carolina. Rice had been grown at Rantowles for over 160 years, with locally grown and woven sweet grass baskets used for winnowing. The tea company operation lasted for 13 years. The property was then sold and used for timber harvesting.

In the late 1950s Lipton Tea Company became interested in finding an alternative in the United States to growing tea in India, Sri Lanka, and Africa. Cuttings and root stock were transferred from Shepard’s Pinehurst Farm to Lipton property on 127 acres of Wadmalaw Island in 1963. Ten acres were also cultivated in Summerville. Since the tea plants had grown wild and randomly cross-pollinated for 45 years on Pinehurst, they are now considered “South Carolina hybrids” of the Assam, “big-leaf China” variety. Vegetative cuttings were taken of the Pinehurst plants, which were carefully labeled by their field position. This process creates exact clones, rather than seedlings. Of the 320 varieties grown on the Charleston Tea Plantation, 315 come from the Summerville site.

Despite Lipton’s investment of $100,000 in a vacuum-driven harvesting machine, they were unable to significantly lower labor costs. Lipton sold the farm in 1986 to the former head of Lipton’s research division, horticulturist Mack Fleming, and co-owner William Hall, a professional tea taster (Nelson, 1988). Fleming improved his design of an air-conveyance type mechanical harvester—a major technological innovation addressing the relatively high labor costs frustrating two centuries of attempts to commercially produce tea in the United States. A native of nearby Clarendon County, Fleming was familiar with methods used by the area’s cotton and tobacco farms. He combined elements of a cotton picker and a Powell tobacco harvester for his John Deere-type hydraulic hybrid (Fig. 4).

From Negro schoolchildren plucking individual tea plants at turn-of-the-century Pinehurst (Fig. 3) to Fleming’s harvester and the long hedges of tea bushes with machine-friendly symmetrical aisles and mechanically cut flat tops (Fig. 5) at Charleston Tea Plantation, is a pictorial record of the progress of Southern agriculture in 100 years. At present, tea is harvested from the top of the plant every 15 to 18 days throughout the May-October growing season. A quarter inch of growth since the previous cut is removed from the top, including the first three “pekoe” leaves, and then back-cut to remove the hard debris on the top. Fertilizer is applied six times a year between April-September. Transplanting occurs in July, blooming in October-December. The genetic material represented by the South Carolina field hybrid tea plants is considered by Fleming to be crucial for the continuing success and distinctiveness of American Classic.
Following plucking in the afternoon, leaves are placed in withering troughs for 18 hours of air drying that reduces 68 to 80% of the moisture. They are then crushed, or macerated, in grinding machines to expose more surfaces to oxidation. After spreading on mesh cloths for 90 minutes, leaves turn a copper brown color. Drying for 28 minutes at 248°F reduces moisture content to 2%, and the color to its characteristic black (Carolina Reporter, 1996). Static electric rollers remove stems and fibers. Leaves are sorted by taste into 15 bins, to be mixed for consistency. Machines form 120 bags per minute. Ice tea bags have no strings or tags. Bag and tag material are purchased from a local German supply company in Summerville, South Carolina. Instant ice tea is bottled in Greer, South Carolina by leased machines primarily used for an apple juice product.

Distribution costs that plagued Shepard are solved with the modern mass marketing system of selling through large chain stores. Charleston Tea Plantation's product is sold under its own name in upscale regional grocery stores such as Harris Teeter, regional chains such as Publix, and under store labels at national discount chain Sam's as "Sam's Choice." Wal-Mart reportedly inspects the product even more frequently and vigorously than the federal or state departments of agriculture. "American Classic Tea" is now sent in containers to Spain, Japan, and the Middle East.
CONCLUSION. Tea production is "an area of very little previous research" but of great interest because it represents "a continuum of efforts to reestablish agricultural productivity [in the South] after the Civil War" (Adams and Trinkley, 1991, p. 25), reaching back to possibly continue efforts made at isolated sites since the Revolutionary War. Commercial tea production in South Carolina did not meet with sustained success, however, until the substitution of machinery in the form of Fleming's novel harvester as American technology's answer for low global labor costs. Traditional tea giants India and Sri Lanka are also experimenting with machine plucking at present. Plantation agriculture involving Carolina tea thus obviates a key part of the definition of a traditional plantation: "an agricultural system, generally a monoculture, for the production of tropical and subtropical crops . . . corporate holdings are large and employ labor on a large scale" (Mayhew and Penny, 1992, p. 177).

While climatological conditions permit tea to grow wild in sections throughout the Southeast, the human element of industrial organization has restricted its commercial production until the present time. The history of tea cultivation in South Carolina is a series of consecutive chapters lasting as long as the life of the owner: Irwin in 1776, Michaux at Middleton and Tyler's "Tea Farm" around 1800, Smith at Greenville in 1850, Forster in Georgetown in 1874, Jackson in the mid-1880s at Newington, Shepard at Summerville's Pinehurst in the 1890s, Trimble and Tyler at...
Rantowles from 1901, and now Lipton's heirs Fleming and Hall on Wadmalaw Island since 1963. Sturdy and adaptable as the individual tea plant may be, its tenure as a commercially viable crop has been tenuous in the United States.

NOTES

1 From a letter in Irwin's handwriting, in the manuscript collection at the library of South Caroliniana, University of South Carolina, Columbia, South Carolina.

2 Charleston's contribution to American tea includes the invention of "Constant Comment" and the Bigelow Tea Company. Bertha West Nealey grew up on a plantation outside Charleston. While working with her friend Ruth Bigelow as "upper-bracket decorators" in New York City in 1939, she mixed some Chase & Sanborn Company tea with orange peel and spices to imitate her grandmother's home recipe. A Park Avenue client asked if she could have some of the mix for a charity party she was giving, and the next day reported her guests were full of "constant comment" wanting to know about the tea. Bigelow packaged and marketed Nealey's mix under that name to premier department stores in the City; it proved the flagship offering of a thriving tea company.

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