

EXPERIMENTAL TEA GROWING IN THE UNITED STATES.

BY J. A. STEWART.

For many years the practicability of tea growing as an industry for the southern districts of the United States has been the object of more or less study and experimentation. Hitherto there has been no feasible solution of the great problem of adaptation, although it has been repeatedly urged that persistent effort accompanied by intelligent study of the subject would bring ultimate success. The expenditure of time and money involved, in addition to the strong doubts of final results, have frequently caused abandonment of the efforts after brief experiment. The great obstacles have been cost of labor and deficiency of rainfall. Oriental wages are so meager that competition is seemingly impossible, and the amount of rainfall deemed essential for profitable production is greatly in excess of any registered precipitation in the South.

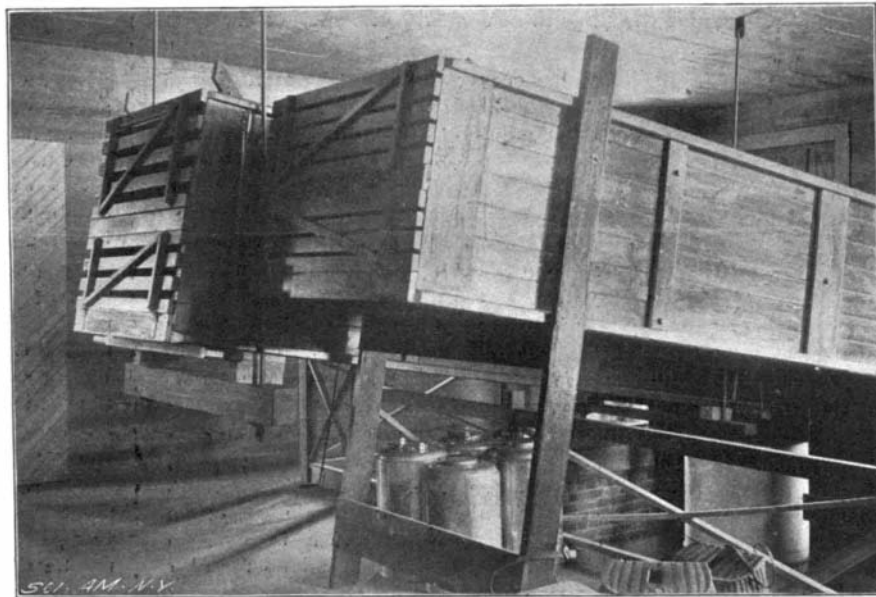
The promising results, however, which have recently been attained through the sustained efforts of Dr. C. U. Shepard, of Summerville, S. C., are calculated to attract general attention and to diminish in a large measure the existing incredulity as to profitable production of tea in the United States. Dr. Shepard is a scientist of means and culture whose perseverance and skill have apparently demonstrated that the domestication of the tea industry is a certainty of the near future. His work has recently received the hearty endorsement of Secretary Wilson of the Agricultural Department and of Congress in an appropriation of \$5,000 for the use of that department in furthering the scheme of investigation. The public is naturally interested in this subject, which has such an economic bearing, for last year 71,937,715 pounds of tea at a price of 14 cents a pound were imported, representing an industry of \$10,000,000.

Dr. Shepard's experiments thus far are chiefly valuable along the line of agricultural science precursory to ultimate victory on an economic basis. His estate, called Pinehurst, consists of about 700 acres of gently undulating grounds dotted with thick woodlands. A large part of the domain is occupied by the Pinehurst Garden Park, devoted to the culture of a noticeably fine collection of ornamental trees and shrubs, including Deodar cedars, Retinosporas, Biotas, Magnolias, Camellias, Cupressus, Junipers, and camphor trees. Hedges are predominant, such as Privets of various species, Spiræa, Hibiscus, Lagerstremias, and Citrus trifoliata, the last an eminently successful barricade against the intrusion of cattle.

About fifty acres of this beautiful estate are set in the tea gardens, which are in a noticeably high state of cultivation. The "Rose Garden" patch of tea, planted in 1890, has been in bearing a sufficient length of time to give measurable results. The chosen site for this initial garden was an old piney woods pond, with its black, rich (in humus) but sour surface soil overlying quicksand and a substratum of clay. The ground was thoroughly subsoiled, drained, and heavily sweetened with burnt marl. It was afterward plowed deeply, followed with a subsoil plow stirring up and pulverizing to a depth of 18 inches or more. In preparation for the garden, the seeds, when received from the Orient, had been at once sown in beds of light fibrous soil and shaded from the direct sun, the native habitat of tea plants being an undergrowth in shady forests. In a few months after the soil treatment about one thousand seedlings of the acclimated Assam-hybrid tea were set out 6 by 6 feet quincunx, and shaded on the southwest side by the insertion of a broad shingle.

There was considerable slowness evidenced in the early growth of the species (which resembles in this respect its relative the *Camellia japonica*), attributable

possibly to the necessity for overcoming the original acidity of the soil. Delay was also occasioned by the erroneous plan of pruning, following the foreign practice and adopted at the beginning, whereby clean stems were maintained, and the loss of many plants resulted. So great was the degree of disappointment at this stage that it well nigh forbade a continuation of the experiment. In consequence, little leaf was picked until 1894, when 151 pounds of green leaves were



INTERIOR OF PINEHURST (S. C.) TEA FACTORY—DRIERS FOR FIRING TEA.

garnered, later crops being: 1895, 333 pounds; 1896, 600 pounds; 1897, 648 pounds; 1898, 1,200 pounds. Last year the green leaves afforded nearly 300 pounds of Pinehurst best black tea, which retails in Charleston at \$1 a pound.

At present this Rose tea garden contains about one thousand bushes, each bush composed of many stems; the result of cutting out the main stem to induce a luxuriant sucker growth. Two hundred of the younger plants which replaced the older ones that died naturally produce less leaf; and altogether the garden of a little less than an acre contains the equivalent of nine hundred plants in good bearing. The usual number in Oriental gardens is two thousand plants to the acre.

On the basis of nine hundred plants, the production per bush is almost five ounces of tea, which equals the best yield per bush of Ceylon and India and is from

it is from one to two ounces; in India and Ceylon three to five ounces. In the last named countries there are a few exceptional estates which annually produce over 1,000 pounds of tea to the acre. Dr. Shepard looks for the doubling of the output for a year or two, although he states that it is impossible to estimate the limits of expansion before the plants reach maturity. The increase each year, it is to be noted, has amounted to almost 100 per cent, with the exception of 1897, when a prolonged autumnal drought materially interfered with leaf product.

This gratifying result of an experimental tea garden presages final economic success and attests the wisdom of the methods of cultivation adopted by the grower. Two larger gardens, also formerly piney woods ponds planted with Darjeeling seedlings, promise successful rivalry within a few years; and yet others give token of still greater productiveness.

The main points to be observed in cultivation inhere in the method of pruning; first directed to the gradual extension of the breadth of the plant, thus increasing the number of shoots available for picking, and second, to strengthen these shoots, that their vigor may be maintained up to the last flush and they are able to react quickly in fresh delicate foliage. Both scientifically and economically, this is better than the plan pursued in India (of a single severe pruning every fourth year and a rest the year following), as there is no depreciation in the strength of the plant and no loss of crop entailed.

The experiment has further depended for its degree of success on the selection of plants that will produce fine tea and yet withstand frost, seeds from the higher grades of Ceylon and Assam being too tender, while the older varieties of the plant produced in China will endure a temperature of 25 degrees. The most promising variety, combining hardiness with a good-sized delicate leaf, is that brought from Darjeeling, at an elevation of 3,000 feet.

By means of draining in connection with deep soil cultivation, a more ample and lasting supply of moisture has been secured for dry times. This conservation of moisture is also furthered by a careful system of surface culture which greatly prevents evaporation from the upper stratum of soil. A gain equivalent to a fall of 10 to 15 inches of rain has thus been secured, and tea growing made possible in any region where the yearly rainfall equals 56 inches. Asiatic authorities

assert that from 80 to 100 inches are essential and the greater precipitation should come in the early part of the year. Some of the best tea districts are known to have 120 inches of rain per annum. In districts favored with sufficient heat and moisture the operations of manufacture proceed uninterruptedly during the whole period of active growth, the plants furnishing from fifteen to twenty pickings yearly.

In his method of curing the leaf, Dr. Shepard does not permit direct sunlight to strike the tea leaf either in withering or in the final drying; consequently there is little or no red leaf in the product until the autumnal plucking when it seems to be almost inevitable on account of some unknown chemical changes in the leaf. The Pinehurst black tea is made very largely by mechanical process, which is used in sifting, rolling, oxidation, and firing. Green tea of the highest type has been produced, the sort that gives a pea green liquor and reacts at once on the nervous system. It is made from the same leaves as the black

tea, the difference being in the preparation. Green tea has to be made entirely by hand, and is on that account very costly. If fired at a suitable low temperature to preserve its fragrance, it is apt to undergo a change in a couple of months whereby the liquor changes from green to yellow.

The Pinehurst black tea retails in the Charleston market at \$1 a pound. It has been pronounced by an expert after an exhaustive test as comparing favorably



TEA GROWING IN SOUTH CAROLINA—PICKING TEA LEAVES RAISED FROM SEED FROM THE "DRAGON'S POOL" GARDEN IN CHINA.

two to five times the average of China and Japan. If it were a full acre, the yield of the Rose garden would be nearly 400 pounds of prepared tea last year. And if the plants had been set in closer proximity to each other, as has been done in later gardens of the estate in conformity with Oriental usage, the output per acre would be greater. The Rose garden has not quite attained its maturity. The average yearly production per bush in Japan does not exceed one ounce; in China

with Ceylon tea selling in the New York market at 25 cents a pound wholesale. It has some of the characteristics of Ceylon tea, but is radically different from Formosa Oolong tea, which it resembles somewhat in appearance.

As is well known, the finest teas made in the Orient will not bear transportation to the United States, and are never seen in this country. As Dr. Shepard is aiming at the production of these finer grades, the leaf plucked from his bushes rarely consists of more than the Pekoe tip and two leaves, and then only to the first Souchong. The picking of a coarser and larger leaf or two would, of course, greatly increase the yield and lessen the cost. The actual cost per pound of the several operations in the growth, picking, and curing of the crop of 1898 were: pruning, 3 cents; manuring, 3 cents; cultivation, 1½ cents; leaf picking, 14 cents; factory work, 6 cents; a total of 27½ cents. Possible reductions on a conservative estimate lessen the cost of production to 16 cents a pound. The chief expense, it is seen, is that of picking, which is about eight times more than the same work would cost in Asia and at present rules out competition as regards the lower price teas.

In facing the difficulty of obtaining laborers when he needed them, Dr. Shepard has hit upon a plan which savors largely of humanitarian endeavor. Seeing the mass of idle young colored people about him, he proposed to give them the elements of an education, providing school house and competent teacher at his own expense, on the conditions that they would learn also to pick tea at reasonable wages for the service, a mutual benefit plan which has resulted favorably to all concerned.

In the establishment of a large tea estate, a considerable initial outlay is naturally required. The expense of raising and setting out the tea seedlings varies from \$25 to \$50 an acre whether raised from foreign or domestic seeds. A suitably equipped factory is necessary, costing from a few thousands upward, according to the proposed scale of operations. But the permanence of the investment commends it. The best Japanese tea comes from bushes 200 years old. The annual output already realized at the Pinehurst tea gardens reached a total of 3,500 pounds during 1898.

The plan of the National Department of Agriculture to establish a tea farm in every Southern State as soon as this can be done intelligently will lead to more general experimentation by our scientists with these plants of the tropics. Aside from the work of Dr. Shepard very little has been attempted in a strictly scientific manner. The Japanese have done something in the way of analyzing the tea leaves at different seasons, but their conclusions are far from being conclusive or satisfactory.

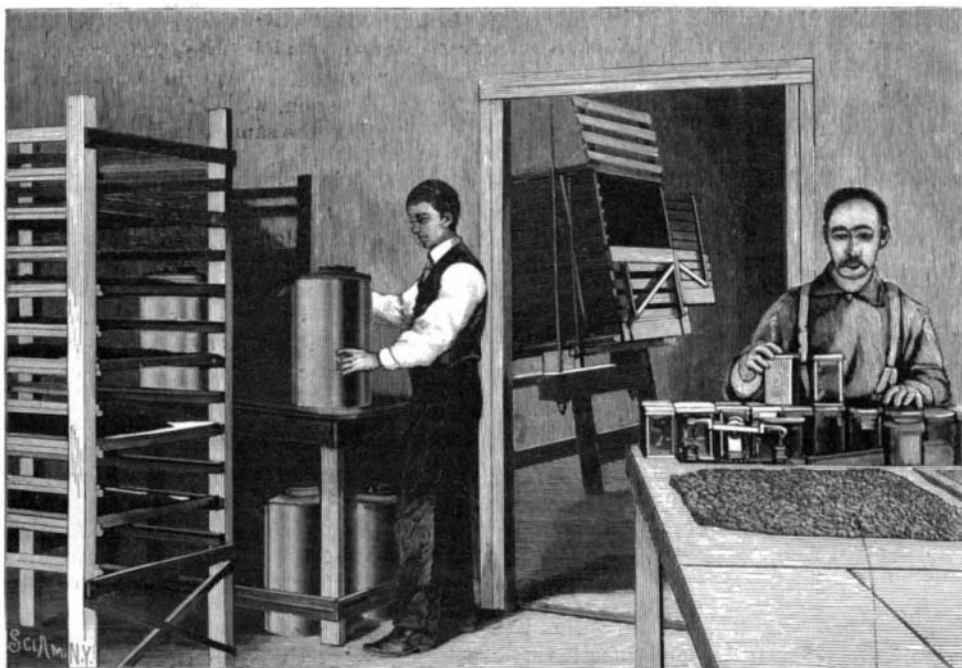
THE RETURN OF ADMIRAL DEWEY.

Since the time of the nations of antiquity, the homecoming of a great warrior, successful either on land or sea, has ever been the occasion of great demonstrations, such as no other event can inspire, so that we feel no apology is necessary for the presentation of a number of views of Admiral Dewey's arrival and subsequent sojourn at Trieste, Austria. The American people hold Admiral Dewey particularly dear by reason of his daring achievements at Manila. To-day personal valor in the navy is not to be underestimated, but it is the mind rather than the hand which wins the day. It takes a brave officer to run his vessel through a harbor protected by contact and observation mines, and this warfare, in which brain power plays such an important part, has begotten an entirely new type of sailor. Admiral Dewey is such a man. With experience in a previous war when ironclads were in their infancy, he combines all the skill of the old school with that of the modern officer who learns from day to day, and who is constantly on the alert to gain information regarding vessels "built and building" or on guns and armor.

The battle at Manila Bay occurred at a most opportune moment, allaying our fears that we were unprepared, and striking terror to the Spanish arms. It was the beginning of hostilities and the beginning of a victorious end. The battle won, Admiral Dewey remain-

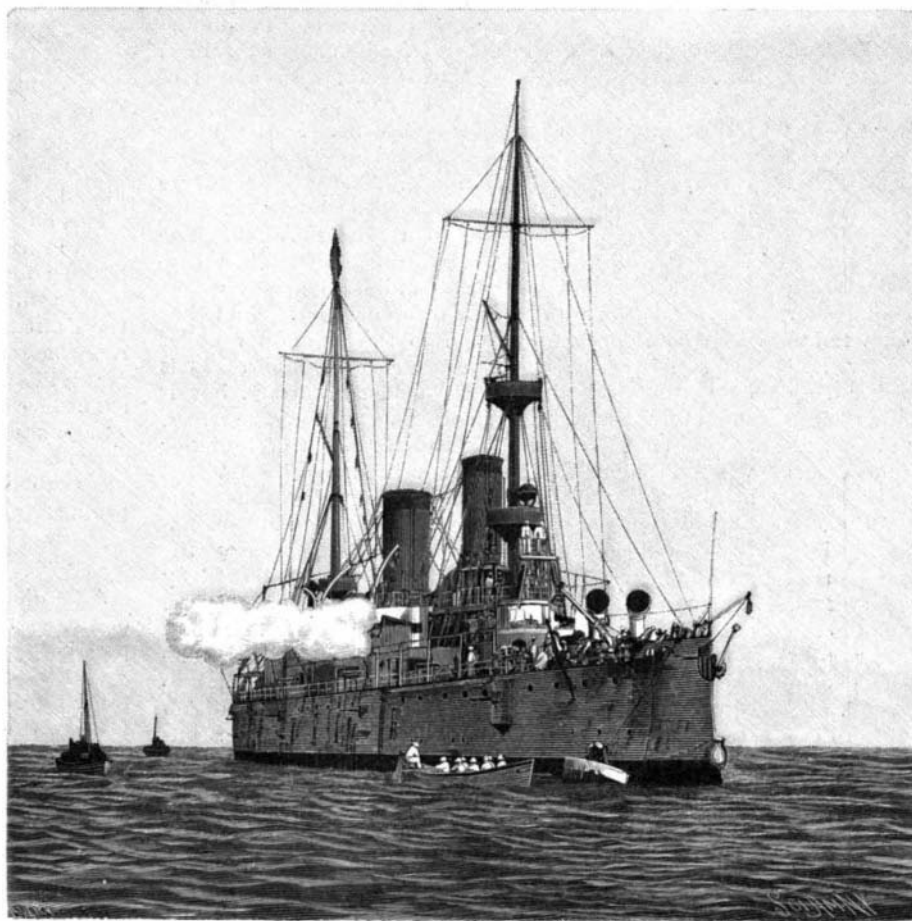
ed at his post administering the affairs of the unsettled community until even he felt the need of a rest, and he is now making his way westward on the flagship "Olympia" via Hong Kong, Colombo, and the Suez Canal, and then by way of Europe, and he will probably arrive at New York about October 1, where he will receive such a welcome as no other American has ever had.

The "Olympia" reached Suez July 13, and then it



DYEING, WEIGHING AND PACKING TEA LEAVES.

was known that Trieste would be the first European port to bid him welcome. The "Olympia" reached Trieste on the morning of July 20; she came into port with her colors flying and exchanged the twenty-one gun salute with the fort. Our engraving is made from a photograph taken as the first gun of the salute was fired. Consul W. S. Hossfeld boarded the cruiser and exchanged congratulations with the Admiral. Subsequently the Port Captain, the Captain of the "Amphitrite," and the Admiralty Captain, in the absence of the Austrian Admiral, boarded the "Olympia" and welcomed Admiral Dewey. The Hon. Addison C. Harris, American Minister to Austro-Hungary, with his first secretary, and Captain Beehler, Naval Attaché to the American Legations at Berlin, Vienna and Rome, next arrived, and then came the local authorities. One of our engravings shows Minister Harris leaving the



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ARRIVAL OF THE "OLYMPIA" AT TRIESTE—THE SALUTE.

"Olympia." Among the other visitors were consuls of several countries and various officials. Then followed a round of visits which the dignity of the Admiral's high rank demanded, and all were greatly charmed with his affability and modesty. A banquet was given in the Hôtel de Ville by Minister Harris. The military authorities posted a guard of honor outside the hotel where the Admiral was stopping.

The visit of the "Olympia" to the port created great

interest, and all day long the piers were crowded with persons anxious to see the vessel or to catch a glimpse of the unassuming victor of Manila Bay, and small boats constantly crowded around the cruiser. On July 22, Admiral Dewey visited the park and castle of Miramar, which was built by Maximilian, whose brief occupancy of the throne of Mexico ended so soon in death. The Admiral was particularly interested in the many mementoes and reminiscences of the Prince which were scattered about everywhere according to the good old conservative European custom. In the evening, a banquet of twenty-two covers was given on board the "Olympia," and the next day a visit was made to Optchina, an elevation of 1,035 feet, which commands a beautiful view of the city and harbor. Notwithstanding the fact that Admiral Dewey objects to have his photograph taken, he found photographers everywhere, and he is said to have been greatly amused by the assiduity with which he was pursued. One of our engravings shows the Admiral with Captain Lamberton and Consul Hossfeld and Lieut. Brumby paying official visits, and the Admiral walking and driving in the park at Miramar. At the various dinners which took place and in the official calls, Admiral Dewey never once let fall a single word which even the most ingenious diplomat could twist into an opinion on international problems.

While at Trieste, he cabled that the arrangements made for his reception at Washington were satisfactory to him, and he will soon have the greatest honor ever conferred on a soldier or sailor in the history of our country, the sword voted to him by Congress being presented to him by the President on the steps of the Capitol at Washington.

On August 1, the "Olympia" sailed for Naples at four o'clock in the afternoon and arrived at that beautiful city on the morning of August 5. An enormous crowd assembled to see Admiral Dewey, and all who are familiar with the mercurial temperament of the pleasure loving Neapolitans will not be surprised to learn that their greeting was enthusiastic, and they cheered him lustily. Many buildings displayed American colors and the reception by the Prefect and municipality was most cordial. Italian officers are to give the Admiral a dinner on a warship, and he has been asked to be present at the launching of an armorclad and there seems to be no chance of a dearth of amusements. His further movements have not been made public at the time of going to press. It is considered very doubtful if he will visit England, but it is greatly desired in that country that such a visit be made.

Decision in the Griffin Mill Case.

The Bradley Pulverizer Company have won their case in their appeal from the decision of Judge Kirkpatrick, of the Circuit Court of the United States for the District of New Jersey, who decreed that the Griffin mill did conflict with the patents of the Huntington Dry Pulverizer Company.

In order to absolutely settle this question, the Bradley Pulverizer Company appealed from this decision to the court of final record in patent matters, the United States Circuit Court of Appeals for the Third Circuit, Judges Acheson, Dallas and Buffington presiding, and that body has rendered an elaborate opinion, reversing the decision of Judge Kirkpatrick, and sustaining the Griffin mill patent, saying: "In short, we have reached the conclusion that, both in construction and mode of operation, the two machines are essentially dissimilar, and that, therefore, they cannot be regarded as being, in the sense of the patent law, substantially identical."

"It follows that the decree of the Circuit Court must be and it is reversed; and the cause will be remanded to that court with direction to enter a decree dismissing the bill of complaint with costs."

It will thus be seen that the Bradley Pulverizer Company have won their case, and established the fact that the Griffin mill is radically different, both in structure and in principle, from those of their competitors.

THERE are 45 admirals in the French navy and 330 generals in the French army.