

THE
PLANTERS' MONTHLY

PUBLISHED FOR THE
PLANTERS' LABOR AND SUPPLY COMPANY,
OF THE HAWAIIAN ISLANDS.

VOL. XI.] HONOLULU, NOVEMBER, 1892. [No. 11

Cuban centrifugals 96 deg. test, were quoted in New York, Nov. 12th, at 3.38 for raws, and 4.72 for granulated.

The consumption of sugar in the United States for the year ending September 30th, 1892, was 1,890,842 tons. In 1882, it was 1,061,220 tons. Of the total consumption only 218,725 tons were produced in the United States. The importations from Cuba alone were 926,855 tons.

The Ewa plantation will commence grinding the first week in December, and have 1,300 acres of cane to grind. The Makaweli, Kauai, plantation hope to commence work with their new mill December 15 to 20, and will harvest 2,000 acres of plant cane, as the first crop.

The Chino, California beet sugar factory has closed its work for 1892, with the total output of 7,687,385 pounds of sugar, all of which was sold to the Western (San Francisco) Refining Co. at $2\frac{3}{4}$ cents for 86 deg. test. In addition, the company received \$136,894.84 as bounties under the McKinley act.

The sugar crop in Louisiana for this year promises to be about 200,000 tons. It is being freely purchased by the refiners at the basis of 3 and 3-16c. for 96 deg. test, with 1-16c. per degree up or down. All the sugar is made as near 90 deg. test as possible. Besides this they receive two cents per pound bounty from the government.

CUBAN LABOR RATES.—In a letter from Havana, Cuba, to the *Louisiana Planter*, occurs the following paragraph, showing the price of labor in August last :

“Salaries asked by laborers range at from \$15 to \$16 per month with, and \$20 to \$25 per month without board ; but the number of men willing to work for a fixed salary is quite limited, as the greater part prefer to do contract jobs, to which effect they unite themselves in gangs of ten to fifteen, with a foreman, who contracts with planters for the tilling and cleaning of their fields and the cultivation of the cane at a stipulated amount per caballeria, say thirty-three and one-third acres. It is said that laborers have adopted this method of working in order to be able to pass from one plantation to another whenever they please, and planters are compelled to yield to their demands.

HOW TO PROPAGATE CANE SEEDS.—Between two and three weeks after the arrow has issued from the cane, pluck the flower or seed by cutting the whole arrow. Put the arrow in a bag and keep in a shaded place. Break up some soil very fine, with which mix a small quantity of the sweepings of a fowl house. Fill some cases with this prepared earth and sow on the surface, without covering the grains. Then cover the cases with straw to keep off the sun, but see that the straw is so arranged that the air can have free circulation. Uncover at night, and cover up in the morning till the plants are sufficiently strong to bear the sun, and then start by letting in the sun for half-an-hour, in the morning for preference, lengthening the period every five or six days till the plants are strong enough to remain uncovered all day. Water gently, so that there is no force on the plants, which would unroot them. Keep the soil always humid without letting it become too wet.—*Queensland Sugar Journal*.

FLORIDA'S TROPICAL PRODUCTS.—A recent report of the State Commissioner of Florida gives the following statistics of some of her products for 1891 :

Oranges—2,023,044 boxes, value	\$ 3,362,575 00
Pineapples—3,515,160 apples, value.....	147,702 00
Bananas—49,397 bunches, value.....	19,682 00
Cocoanuts—115,710 nuts, value.....	2,724 00
Cotton—32,530 bales, value.....	1,397,060 00
Sea Island Cotton—15,199 bags, value.....	1,012,188 00
Sweet Potatoes—1,554,739 bushels, value.....	623,709 00
Sugar—1,422,077 pounds, value.....	175,390 00
Peanuts—401,415 bushels, value.....	363,954 00

The total agricultural products for the year named amounted to \$19,508,447.

————: o :————

*EXTRACT FROM A LETTER FROM R. A. MACFIE,
JR., FORMERLY OF KEALIA, KAUAI.*

CENTRAL DE CANOVANAS, PORTO RICO,

SPANISH WEST INDIES, Sept. 19th, 1892.

I came out here as manager for the Colonial Company of London, which owns a large number of estates in the West Indies, Demerara, Trinidad, Barbadoes and this Island.

This is a central factory that buys cane from Spanish planters, and grows a certain amount of cane also on lands of its own. The mill is about the same size as the Kilauea mill and the cane is brought in by railways, of which there are some fifteen miles. It is a desolate place, as there are no other English people near, and even in San Juan the Capital of the Island, there are no English or Americans to speak of.

I have been here a fortnight to-day, and hardly feel at home yet, especially as my knowledge of Spanish is limited. Managers in the Hawaiian Islands don't know how well off they are living in a civilized country, with all the comforts of the United States or United Kingdom about them. The average managers' salary is about £400 per annum and a very poor house, not as good as most married lunas have on the Islands. This will give you some idea of rates of pay in the West Indies.

On my way here I spent a week in Trinidad, on one of the company's best estates, where they make 7000 tons of sugar per annum. I touched at Barbadoes, St. Vincent, St. Lucia, Martinique, Antigua and some other Islands. None of these compare with the Hawaiian Islands. The soil in all of them is inferior, and most of it resembles the mauka land of Kilauea, and requires a great amount of draining to make it grow cane at all. At the Usuie St. Madeleine, where I spent most of my time in Trinidad, they rarely get more than two tons per acre, and don't average two tons even from their plant cane; so you may guess what an acreage it takes to make 7000 tons of sugar. They have ample labor however, averaging about thirty cents per day. The wages paid the coolies are twenty-five cents per day, but the incidental expenses bring the cost up to thirty cents. The coolies seem a good class of laborers, and from what I saw of them, I think I would sooner have them than Japanese for field work. The laborers on this Island are exclusively Spanish-speaking negroes, and are not very good or very bad. Wages run about thirty-five cents per day.

I think with the much better soil in the Hawaiian Islands the greater economy of labor there, the superior work of the mills there, and the American progressive spirit that prevails there,—they ought to be able to hold their own even with more expensive labor against the West Indies. These people here are terribly conservative. The Colonial Company is the largest English Company in sugar, and makes about 25,000 (long) tons per annum; but, you will hardly believe it, still owns and works a number of places without vacuum pans, with the old primitive arrangements of boiling the juice to grain over an open fire. At the Usuie St. Madeleine, which they think a very swagger place, they have only single crushing, and here they are only just putting in double crushing. I don't think that Hawaii has much to learn from the West Indies, except in the matter of keeping accounts and records and statistical tables, etc., at which they beat Kilauea.

In little things, there is much more economy here, than in Hawaii, but in the big matters I think there is much more waste.

*ANNUAL MEETING OF THE PLANTERS' LABOR
AND SUPPLY COMPANY.*

The annual meeting of the Planters' Labor & Supply Company was held on Monday, Nov. 16, in the Hall of the Chamber of Commerce in this city, opening at 9:30 o'clock a.m. There were present at this and subsequent sessions the following gentlemen :

Hon. Alex. Young, President; Hon. W. O. Smith, Secretary; Hons. W. Y. Horner, J. M. Horner, Jos. Marsden, J. B. Ather-ton, Aug. Dreier, J. N. S. Williams, H. M. Whitney, H. P. Baldwin, W. G. Irwin, L. A. Thurston, W. H. Cornwell, Geo. N. Wilcox, A. S. Wilcox, R. D. Walbridge, P. C. Jones, R. R. Hind, and Messrs. W. W. Hall, W. J. Lowrey, Z. S. Spalding, F. A. Schaefer, J. G. Spencer, J. F. Hackfeld, T. R. Walker, T. S. Kay, C. M. Cooke, W. C. Weedon, W. H. Rickard.

On motion of F. A. Schaefer, the reading of the minutes of the last annual meeting, which are published in full in the *PLANTERS' MONTHLY*, was dispensed with.

Hon. W. O. Smith, secretary, read his report.

ELEVENTH ANNUAL REPORT OF THE SECRETARY.

The past year has been one of severe trial for sugar planters. The sudden and great fall in prices of sugar of the previous year, consequent upon the change in the United States tariff, left the plantations in a serious condition. The cost of producing sugar before the change was greater than the prices realized under the new conditions. With high rates of wages, high rents and expensive cost of transporting produce to the market, the situation was critical. For a time it appeared that many of the plantations would have to suspend operations. The danger is not yet over, but thus far only three plantations have suspended. Every energy has been bent to reducing the cost of production and the outlook is not now so discouraging, although but few plantations have more than paid expenses, and many have not met expenses.

To this subject of reducing the cost of production, the Trustees have directed the most attention during the year.

The monthly statements of the number of laborers employed and rates of wages paid have been regularly published and

distributed. These reports have been of value, but it is to be regretted that so many have failed to make the returns to the Secretary. If all would report faithfully, the information thus obtained would be of much greater value.

Wages of laborers have been reduced about one-third, but are still so high that unless further reductions can be made more of the plantations will have to be discontinued soon, and others later.

The effort to obtain more Chinese laborers has not met with success, but it is hoped that the measures now before the Legislature will result in admitting a sufficient number of them to supply the demand, and at wages adapted to the circumstances. The subject is one of national importance.

JAPANESE LABOR.

The supply of Japanese laborers has been sufficient for the most pressing needs, and there have been less complaints in regards to desertions.

The agreement proposed by the Hamakua planters, and referred to the Trustees at the last annual meeting, was drawn up and sent to all the planters. Some endorsed the plan and others made no response. Had it been entered into by all, it is believed that much more benefit would have resulted.

The effort to have the 15 per cent. reserved from the Japanese wages made available to defray the expenses of run-away laborers, failed.

CHEMISTS.

The Trustees appointed a committee consisting of Messrs. H. F. Glade and A. Young to obtain information as to the cost of engaging chemists from abroad for the various districts. These gentlemen will probably report the information they have gained.

MICROSCOPE.

Pursuant to the recommendations of the Company the Trustees procured a valuable microscope in January last and presented the same to Mr. A. Jaeger with the thanks of the Company for the services he has rendered to the agricultural interests of the country. Mr. Jaeger accepted the same and expressed his appreciation of the compliment.

TOBACCO SEED.

The Trustees, by the aid of Hon. J. Marsden procured a supply of tobacco seed from Sumatra, and have distributed small quantities of it to as many as applied for it.

More than one-half of the original quantity remains on hand and supplies can be obtained from the Secretary. Directions for planting, cultivation and curing have been printed, and are furnished to each one who takes a supply.

The conditions upon which the seed is given out, are that each person supplied shall report the result of the planting and furnish the Company with a reasonable amount of the first crop for exportation abroad as samples. The Company desires information as to the location where grown (elevation, etc.), and conditions under which it was produced, and any other circumstances which may be of interest. One object being to ascertain the localities where the best results are produced.

STATISTICS.

Statistics of the sugar crop for the year ending September 30, 1891, were prepared showing the crop, average polarization, and percentage of each grade of sugar. These were tabulated and printed, and distributed among the planters. A similar report is being prepared for the year ending September 30, 1892, and will be printed and distributed as soon as it is completed.

PLANTERS' MONTHLY.

This valuable periodical has been continued to be published regularly by Mr. H. M. Whitney during the year, and has maintained its high character.

REPORTS OF COMMITTEES.

Each member of every committee has been notified of the annual meeting, and reminded of his duty.

CONCLUSION.

With all that is discouraging it is of more importance than ever that the planters' organization be maintained. In union is strength, and by concert of action results can be reached which cannot be attained by individual effort.

Respectfully submitted,

WILLIAM O. SMITH, Secretary.

Honolulu, November 15, 1892.

The Secretary's report was accepted and ordered to be printed.

Mr. F. M. Swanzy, treasurer, being absent, his report was read by Mr. T. R. Walker.

It showed: Total Receipts.....	\$6,092 47
Total Disbursements.....	4,596 40

Balance on hand.....	\$1,496 07
----------------------	------------

The report of the treasurer was accepted and referred to the Board of Trustees for inspection.

The report on Labor being called for by the President, it was read by the Secretary, in the absence of the Chairman R. D. Walbridge, and ordered published. (See page 496.)

On motion of Hon. J. Marsden the report was accepted and ordered printed.

President Young invited discussion on the reports as they were read.

Mr. Baldwin thought some action should be taken by the Trustees on the labor question before the close of the Legislature now in session. The Labor Bill had been handled in the House for political purposes. It would have passed long ago, if it had not been for political purposes. He moved the report be reconsidered and referred to a committee of three with Col. Spalding as chairman.

The motion to reconsider was carried.

The Secretary favored reference to a special committee as had been moved. It required a committee of the strongest kind to present their views to the Legislature. The motion passed.

Col. Spalding said he had been a Trustee for some years, and would not say that the Trustees were not capable of handling the question. But the trouble with the labor question hitherto was, that it had not been attended to by the practical planters. What was wanted was a committee of planters, not merchants, lawyers and doctors.

The President appointed as a committee on labor legislation, Col. Spalding of Kauai, Messrs. Kay of Hawaii, and Lowrey of Oahu.

Hon. J. M. Horner read the report of the Committee on Cultivation. (See page 497.)

Col. Spalding desired to make some remarks on the report. In former times, the committee reports were freely discussed and thus much valuable information was elicited and published. The practice had unfortunately died out, and, by the silent adoption of reports, it might be thought that their contents were accepted without regard to mistakes they might contain. Now, the question of depth of plowing was just like those of cane planting, stripping, transportation, etc., on which different circumstances might dictate diverse practices. It might be the proper thing on Mr. Horner's plantation to plow only six inches deep, but on the speaker's plantation it was considered necessary to plow sixteen inches. Therefore he could not go on record as accepting the opinions of Mr. Horner on plowing:

Mr. Baldwin said it was a mistake to say that discussion had been abandoned, but the practice had been of late years to hear all the reports first and discuss their subjects later.

The President spoke on the value of discussion. He thought it was better to discuss each subject when the report was fresh in their minds. Let them get every side of a question and examine all the ideas presented. Truth was like a torch; the more it was shaken the brighter it shined.

Mr. Marsden believed in dealing with every subject while it was warm. Where the subsoil was richer than the surface, deep plowing was better; but it would be unwise to cast up a poorer than the surface soil. The subsoil should be loosened and stirred.

Mr. Horner explained some points in his report. He had stated facts and results in his work. He did not mean to say that you must never plow deep under any circumstances. He thought that the first six inches of soil contained more plant food than the next six feet. He would like to ask Col. Spalding how much he got when he plowed sixteen inches.

Col. Spalding said the upper layer is soon exhausted. They stirred up the subsoil, not bringing it to the surface. The second year it would no longer be bad soil. Of course the deeper the roots go, the better the cane would be. There should be no particular limit to the plowing. It depended on the character of the soil. He had been plowing the same land for twelve years. He had plowed as deep as he could

with cattle, and then with the steam plow, and he found that going deeper he got a ton more to the acre. He perfectly agreed that the subsoil must not be brought to the surface.

President Young asked Mr. Horner if he would not plow nine inches if that were the depth of the surface subsoil.

Mr. Horner did not know that he would. The first five or six inches were the richest.

Mr. Atherton said that Mr. Chapin on the Kohala Plantation divided a field of 150 acres into three sections—plowed one in the ordinary way, fertilized another, and double plowed and double cultivated the third. The third came out clear ahead.

Mr. Baldwin thought both Messrs. Horner and Spalding were right. It depended on the soil. With a deep soil it paid to plow deep. Kauai was the oldest island and had a pretty deep soil. The mass of the roots went a foot down and often much deeper. Plainly the soil must be loosened that deep. At Paia they had got heavier crops by plowing deep than they got with ordinary plowing where the land was virgin. They cultivated deep in California in order to cut top roots and drive them deep. The speaker went on to say that these discussions were very useful. A few years ago people thought it necessary to cut up large fine cane for planting. Through discussions in this meeting that idea and other mistaken ones had been abandoned, and more practical views adopted.

The report was then adopted.

Mr. Williams presented and read a report on the improvement and economy of boilers, particularly in regard to burning bagasse. The subject was handled in a manner that demonstrated a thorough knowledge of it. Accompanying the report were diagrams showing the construction and setting of five different boilers now in use on our plantations.

Col. Spalding, in reference to the valuable boiler introduced by Mr. Hind, and which had been referred to in the report, wished to speak of his great indebtedness to Mr. Young for the great improvement which he had made in that boiler. At Kealia, they consumed one ton of coal in making five or six tons of sugar by diffusion.

The President thought the company was much indebted to

Mr. Williams for his excellent report. He considered that on these islands there was nothing requiring more attention for its importance than the boiler in the sugar mill. He gave some details of what he had observed in different mills.

Mr. Williams thought that eventually diffusion chips would be sufficient fuel without coal, and that the time would soon come when no coal would be required. At present the chips were not properly burned, so that they did not develop all the heat that was in them.

The report was accepted, and ordered printed.

Mr. J. F. Hackfeld read the report of the committee on Fertilizers, accompanying which were a number of letters on the subject, the reading of which was omitted. The report recommended establishing an experimental station.

A short discussion followed regarding the best method of preparing fertilizers, in which several members engaged, during which Col. Spalding stated that the Kealia plantation made about five hundred tons of fertilizers annually, at a cost of \$10,000 to \$15,000.

AFTERNOON SESSION.

Mr. T. R. Walker presented the report of the committee on Forrestry, which opened a very interesting discussion on the various topics referred to in it.

Mr. Marsden said that it had been proposed to exempt forest lands from taxation, and that a bill was before the Legislature with this object in view.

Mr. J. M. Horner asked what could be obtained from land covered by forests. His observation was that the rain produced the forest, and not the forest the rain. In Hamakua the woods did not retain the rain, nor make springs of water. Of what use were the forests planted above Honolulu? If the man in charge had known his business, he would have planted coffee trees and taught people how to cultivate coffee. No more money should be spent on such forest-planting as that.

Mr. Hall thought there was some force in the remarks of Mr. Horner. He had suggested to Mr. Jaeger some years ago, that fruit trees should be planted instead of the eucalyptus and other trees which were set out.

Mr. Horner, resuming, said much was heard about getting tourists into the country, but what was there in such a forest that tourists cared for? They could see thousands of acres of eucalyptus trees in Australia. If they planted orange and lemon trees, then many tourists who had never seen those fruits growing would be glad to drive up that road to see them. His brother had lime trees growing which yielded \$25 apiece every year. When those ocean greyhounds expected here came they could take such fruits right into the London market.

Mr. Rickard complimented Mr. Jaeger for the great interest he had always taken in Hawaiian forestry matters. He was of the opinion that Mr. Jaeger was doing the proper thing when the forest trees were planted. The speaker remarked on the decreased rainfall at Hamakua and thought that the diminishing forest growth was the cause. He was of the opinion that cattle destroyed the trees and thought that some pressure should be brought to bear on the owners of cattle to limit the area over which their cattle should roam.

Mr. Baldwin said that forests brought rain, and if Mr. Horner had been in Honolulu thirty years ago he would now agree that the increased foliage in and about this city had a great tendency to draw moisture. He was sure that when the trees at the Government nursery were planted, lemon and orange trees would not take root, and therefore the efforts of Mr. Jaeger, should not be criticised, but, on the contrary, he is entitled to credit for the great interest he has always evinced in forestry matters. The speaker considered the matter under discussion a very important one, and attention must be paid to the same, as the koa tree has been attacked by an insect which threatens to totally destroy that variety of wood.

Mr. Spalding remarked that for the present the bulk of planters could not spend any great amount of money towards enclosing lands for raising trees unless there was a quick and certain income. He believed that cattle had destroyed a great many young trees, but could not damage those of mature growth. He believed that the planting of trees should be commenced in a moderate way, and was of the opinion that a dense forest growth was an important factor in causing

rain to fall. The speaker related his unsuccessful experience with planting California fruit trees. He thought that if any practical results could be shown by coffee raisers, plenty of money could be had to place in that industry.

Mr. Cooke stated that when the Waianae plantation was started, there were but few trees on the ground, but now acres of algaroba trees can be seen. He said this was one instance where cattle made a forest and advised all planters to raise algaroba.

Mr. Young spoke of the droughts which Hilo experiences, and thought that the clearing of the slopes of forest growth was the cause of the same.

Mr. Walker's report on Forestry was adopted.

Mr. W. W. Hall read report on coffee and tea. In the course of his report he stated that the Kona Coffee Company would have by the end of the year 120 acres under cultivation, that they have in their nurseries about 200,000 plants, and they expect to plant 50 acres more next year. He estimated that in 1894 and 1895, there ought to be at least 1,000,000 pounds of coffee produced yearly by the various coffee plantations in this Kingdom, and he saw no reason why this amount should not be annually increased after that until coffee would rival the sugar industry.

His report was adopted and will be found elsewhere.

Mr. Hall moved that a committee be appointed whose duty it would be to impart information concerning coffee raising. Carried.

Under suspension of the rules, the Secretary was instructed to cast an unanimous vote for re-election of the Board of Trustees (Messrs. F. M. Swanzy, J. B. Atherton, H. F. Hackfeld, W. O. Smith, F. A. Schaefer, A. Young, W. G. Irwin, H. P. Baldwin, and J. O. Carter) to serve during the ensuing year. Carried.

Mr. Marsden, Chairman of Tobacco Committee, reported on the cultivation of tobacco in Sumatra, and he thought that as good a quality of tobacco could be raised in Hawaii under good management.

A letter from Mr. Sneyd-Kynnersly, of Kohala, Hawaii, on tobacco, was read by Mr. T. R. Walker.

Colonel Spalding said that when he first came into this

country he had occasion to inquire of the old natives about tobacco culture. The speaker had been a tobacco planter, and therefore considered himself a competent judge on the raising of that article. He said Hawaii can never be a tobacco country because the soil is not adapted to it.

Mr. Lowrie, who was posted on tobacco culture, remarked that tobacco must be raised on sheltered lands free from wind.

Moved by Mr. Marsden that the trustees be authorized to place one acre of tobacco under cultivation as an experiment for studying tobacco culture. Carried.

The report was adopted and ordered printed.

EVENING SESSION.

The Secretary read the report of the Committee on Ramie, in the absence of the chairman, H. M. Whitney. It referred to the difficulties experienced in the efforts to secure a process for decorticating the ramie stems. What promises to be the long-sought machine was mentioned, being the invention of Mr. J. C. White of this city.

Accepted and ordered printed.

A valuable report on Fruit Culture, prepared by Mr. L. A. Thurston, chairman, was read by the secretary. The total exports of pineapples up to date had been 37,727. Honorable John Ena had planted 2,000 pineapples at his plantation at Manoa Valley, in 1890 and 1891, and expects to plant 23,000 more plants in 1893. The price of pineapples at the Coast ranges from \$1 to \$6 per dozen, according to the quality and season. Messrs. E. W. Jordan and S. M. Damon have a plantation at Moanalua, with 12,000 imported plants growing. They will increase it to 24,000 next year. The Pearl City Pineapple Co. have 15,000 imported pineapples now growing at Ewa, and they expect to add 25,000 more plants by the end of this year, and they will double it in 1893. Many of the planters favored a co-operative cannery. The Woodlawn Fruit Co. has just received an invoice of 50,000 from the Bahama Islands. They will increase their plant in 1893. Mr. Kidwell's plantation at Manoa contains about 50,000 pineapple plants. Mr. Chas. Wilcox had been the largest exporter of native pineapples during 1892. The total

number of pineapples in the ground, exclusive of Kona pineapples, is estimated at 294,000 plants in 1892, and this number will be raised to 585,000 during 1893. This latter number would still be greatly increased if the 35 per cent. United States duty were to be removed.

Mr. Baldwin read the report of the committee on manufacture. The report gave rise to a long discussion, in which Col. Spalding gave much information regarding his own mill and his observations abroad.

Mr. Marsden thought the clarifying system in vogue on the islands is all wrong. The juice should be clarified in one process and go direct into the double effect. There was no mystery about it, but it was simply to lime the juice whenever it came from the mill. This had been discovered at Honokaa after long experimentation, and produced a polarization of 99 per cent in the sugar.

The President related his differences with Col. Spalding over clarifying processes, remarking that each had his own opinion while both did pretty good work. His own efforts were bent toward getting a certain ropy substance out of the juice.

On motion the report was accepted to take the usual course. The Chair appointed the following committees :

COMMITTEES 1893.

- LABOR—J. B. Atherton, C. Bolte, W. W. Goodale.
 CULTIVATION—H. Morrison, W. W. Hall, J. Renton, Jr.
 MACHINERY—J. N. S. Williams, J. Marsden, R. R. Hind.
 LEGISLATION—H. F. Glade, W. R. Castle, C. Bolte.
 RECIPROCITY—H. P. Baldwin, C. R. Bishop, H. F. Glade.
 TRANSPORTATION—W. J. Lowrey, W. H. Rickard, J. N. Wright.
 MANUFACTURE—Z. S. Spalding, J. F. Hackfeld, A. Young.
 LIVE STOCK—B. F. Dillingham, W. C. Weedon, J. H. Paty.
 FORESTRY—T. R. Walker, T. S. Kay, J. M. Horner.
 FERTILIZERS—F. M. Swanzy, W. W. Goodale, W. G. Irwin.
 TOBACCO—J. Marsden, Z. S. Spalding, A. S. Wilcox.
 RAMIE—H. M. Whitney, W. R. Castle, C. S. Kynnersley.
 FRUIT CULTURE—L. A. Thurston, V. Knudsen, G. N. Wilcox.
 STATISTICS—J. O. Carter, C. M. Cooke, W. O. Smith.
 COFFEE AND TEA—W. W. Hall, J. Austin, E. C. Bond.

REPORTS READ BEFORE THE PLANTERS' MEETING.

REPORT OF COMMITTEE ON LABOR.

To the President of the Planters' Labor and Supply Company:

DEAR SIR:—For your consideration I beg to submit the following Labor Report :

Before the time for the holding of the Annual Meeting of the Planters' Labor and Supply Co., I had hoped that the four bills on the subject of labor now brought before the present Legislature might have been acted upon, as the reports of the committee and debate in the House will bring forth statistics and valuable opinions in detail, that could not be as well obtained in any other way.

That we require cheap labor, plenty of it, of different nationalities, under proper restrictions is, I believe, an admitted fact, not only for the salvation of many of our sugar estates, but also in the pursuit of new agricultural industries, and the homesteader. Especially is this so if we are to compete with foreign countries in raising coffee, cinchona, ramie, spices and other tropical products. Although our rates of wages have been materially reduced during the past two years, even now, especially with our old contract people, they are much too high. This is noticeable when we consider that our present Japanese represent to the planter about \$19 a month, which, however, is being gradually modified by employing them, when their contracts expire, (as also the Chinese,) at from \$12 to \$14 per month with nothing furnished but a dwelling house.

Even at as low rate as \$13 per month it will be seen that our prospects will be severely handicapped if we are to compete with India, where they produce large quantities of tea, fiber and silk, etc., with wages at 8 cents per day, or Ceylon and China, at 16 cents to 20 cents per day, or the British West Indies, who ship to England and New York, at 20 cents per day, where in many cases they work 16 hours a day.

Considering the experience of Queensland, where they stopped the importation of black labor nearly to the ruin of

their industries, and obliging them to resume it, it will certainly point out to us the necessity for keeping up the supply, and that such importation should come from different countries, that we may have a variety of nationalities, is, I believe, generally conceded.

From March 11, 1891, to June 18, 1891, there arrived in this Kingdom:

	MEN	WOMEN
Japanese.....	4239	1479
From January 9, 1892 to June 21, 1892,....	1973	198
 Total Japanese.....	 6212	 1677
From July 21, 1891 to Oct. 16, 1891, Chinese	315	116
	6527	1793
Total number of immigrants who arrived from March 11, 1891, to June 21 1892, under contract, was, women and children, 8320.		
Arrived March 11, 1891, to June 18, 1892, males.....	6527	
June, 1892.....	880	
Total male arrivals under contract from March 11, 1891, to November 15, 1892.....	7407	
Total departures 1891, Chinese and Japanese.	4463	
From January 1, 1891, to March 14, 1892....	571	
Total.....	5034	5034
Balance.....		2373

And although the Legislature will have this matter under serious consideration it is a subject of so much importance in general and in detail, it would seem advisable to have a committee appointed by the Planters' Labor and Supply Co. to investigate the question and confer with the Labor committee appointed by the House.

Respectfully submitted,

R. D. WALBRIDGE,

Chairman Labor Committee.

Honolulu, November 15, 1892.

—: o :—

REPORT OF COMMITTEE ON CULTIVATION—DEEP PLOWING.

To the President of the Planters' Labor and Supply Company :

SIR :—Not being able to consult with the rest of my Committee on Cultivation, I therefore am unable to report as a

Committee, so beg to submit the following as a personal report on cultivation upon the item of "deep plowing."

"Plow deep while sluggards sleep,
And you will have corn to sell and to keep."

The above doctrine has been sounded in my ears from my earliest recollection, and it was received by me as self-evident—a thing not to be questioned.

But looking back after a lapse of fifty years and gathering important facts bearing upon deep plowing, I now find myself doubting a subject I had believed gospel truth. There may be different opinions as to what is deep plowing. Six or seven inches may be considered deep plowing for grain, as four or five inches is the more general custom in America, in the Eastern States formerly, not so much. For corn and potatoes, eight or nine inches may be considered deep plowing, as five or six inches is more generally practiced. In America two or three horses to a single plow, or four or five to a double plow is the power mostly used. With that limited power no deep plowing is done. There are exceptions.

In Hawaii there appears among planters a strong desire for deep plowing of ten, twelve or more inches; few, I believe, plow so deep, more, however, for want of power than a want of disposition to do it.

Deep plowing may be both preached and practiced, but my experience teaches me that better cane will grow on land plowed eight inches deep than if plowed twelve or more inches, and I am not sure that six inches would not be as good as eight on ordinary land.

Deep plowing as here indicated does not mean subsoiling, but plowing up the subsoil and thereby mixing the subsoil with the top soil evenly to the depth the plow runs. Experience teaches me that the richest soil is on and near the top, and if the subsoil is incorporated with the top to an unwise depth, the crop will not be as good as if the land had been plowed six inches deep and the subsoil left undisturbed.

A FEW FACTS.

When preparing for raising our first crop of cane at Spreckelsville our average depth of plowing did not exceed four inches, with the exception of the seed furrow, which was the usual depth.

Our crop was good, exceeded our expectations, one acre measured and weighed yielded eight tons of manufactured sugar. This was an exceptional acre, few others did so well; since then, lands have been plowed ten and more inches in depth on that plantation, but so far as I know no better yield has ever been reported from there since.

After we commenced the cultivation of cane at Kukuihaele, Hawaii, the following among other facts were there developed. One field from which three crops had been taken was poorly plowed twice in preparation for a fourth crop, an average depth of six inches, I state "poorly plowed" advisedly, as it was done by contract with native oxen used by native drivers, and indifferently supervised. The cane was well cared for after planting, and the yield was over eight tons of manufactured sugar, average over the whole field of eighty acres. Seeing such encouraging results from an indifferently plowed field our neighbor determined to beat the yield, having a field near at hand of about the same quality the larger part of it had been used as a pasture for some years and was every way adapted for producing a large crop.

To make things doubly sure, he fertilized the poorer part of the field and double plowed all of it, what I mean by double plowing is, he rigged up two large plows with six strong mules to each, both worked on the same furrow, the first plowing seven or eight inches deep, the other following and plowing the same furrow several inches deeper, breaking up the subsoil and mixing it with the rich top soil. This crop was good, but not extra, its yield was at least two tons per acre less than the eight ton field which was plowed only six inches deep, although it was plowed nearly twelve inches deep, rendering the expense double for plowing besides the cost of fertilizing.

I see no reason why this crop of our neighbor's should not have equalled the yield of the eight and a half ton field if the plowing up and mixing the poor subsoil with the rich top soil had been dispensed with.

We tried again to raise cane to equal, and we hoped to exceed, the eight and a half ton yield, as we had heard that a distant neighbor had from a ten acres lot, got an average yield of 12 tons from each acre. And as our neighbor's deep plowing had failed to open our eyes to the injury liable to be done by

deep plowing, we did as our neighbor had done, that is, double plowed and fertilized. We made a greater failure than our neighbor, only getting four and a half tons per acre, a little over one-half than we got from the field plowed six inches deep, with no expense for deep plowing and fertilizing.

We now pass to Kukaiau. There our only good crops were raised on lands plowed an average depth of seven inches,—all however, virgin soils. In replanting the plantation, the tree roots being out of the way we plowed deeper. Still believing in deep plowing with no reason to sustain that belief, except the action of some planter and tradition. We plowed one year 14 acres twice, ten inches deep each time before planting, these lands had a thin soil, we fertilized about one-half of the land. We did not count on a large yield, however, the deep plowing and fertilizing encouraged us to hope for a four ton yield per acre, we realized only two, I think the deep plowing spoiled our prospect, instead of getting 560 tons as we expected, we were rewarded with only one-half that amount.

. In conclusion, I will say, if one wants to deepen his soil and get good crops while doing it he must do it slowly, going a little deeper each year.

I do not wish to be understood as advocating shallow plowing or slovenly cultivation, but the above and many other facts convince me that eight inches deep for cane is better than twelve or more, and I am not convinced that six inches is not as good as eight with slight exceptions, and where the soil is thin, better. I have never seen an extra good crop grown on land plowed ten inches deep, I have on land plowed six and seven inches.

Most respectfully,

J. M. HORNER.

—:o:—

REPORT OF COMMITTEE ON MACHINERY.

To the President of the Planters' Labor and Supply Company:

SIR:—Your Committee on Machinery have this year decided to take up the subject of Boilers and Fuel, as in use upon Hawaiian sugar estates, being perhaps at this time of low prices and close economy a more important branch of

the working of our sugar factories than any other that can be named.

It is not saying too much to assert that up to the present time, Hawaiian sugar men have through force of circumstances reached a higher development of furnace for burning green bagasse or exhausted diffusion chips than those in almost any other cane sugar producing country, and an enquiry into the evolution of this furnace will perhaps be interesting.

When the great mills at Spreckelsville were designed and built, a number of improvements were introduced, such as the 2-roller mill, the triple effect, and the furnace for burning bagasse direct from the mills.

This furnace was a radical departure from the furnaces in use at that time, which are shown on the drawings of boilers used at Naalehu, and Honuapo mills in the years 1879 and 1881. The drawing of the Spreckelsville boilers shows the construction of that furnace, which consists of a series of grate bars arranged at an angle of about 40 deg. and running across the furnace like steps, hence the name of step ladder grates.

The bagasse is fed to this furnace by a automatic stoker which is adapted to give a regular and continuous feed to the furnace, the bagasse sliding down the inclined grates and being almost completely consumed when it reaches the bottom. This furnace is with few changes universally used in this country, most mills however dispense with the mechanical stoker. In order to adapt this furnace for burning diffusion chips, which is a much more difficult fuel to handle, an improvement has been introduced in the shape of forced draught, so arranged that a sufficient energy of blast may be attained without lifting the fuel and blowing it away from the grates, this has worked well at Kealia mill and elsewhere and is shown in the drawing of that boiler; an account of fuel expense of Kealia mill for the last season is also included in this report.

The most serious loss of heat which occurs in the sugar house is in the waste gases of combustion; just how much this is, will be shown, as follows:

... 100 pounds of average cane contains 89 pounds of juice

and 11 pounds of woody fibre; the juice contains 18 per cent. of solids; let us assume that 15 pounds of water is added during the crushing of the 100 pounds of cane; that the extraction of soluble solids is 90 per cent., and that the resulting bagasse contains 50 per cent. moisture. Then 100 pounds of cane, plus 15 pounds of maceration water, minus 22 pounds of bagasse, containing 11 pounds of fibre and 11 pounds of moisture, equals 93 pounds of juice obtained, which contains 90 per cent. of solids present in original juice, and equals 14.42 pounds soluble solids obtained. The bagasse contains 11 pounds fibre and 11 pounds liquid which retains the remaining 10 per cent. of soluble solids in the original juice, equals 1.6 pounds, so that the bagasse or fuel is made up of 11 pounds fibre, 1.6 pounds soluble solids and 9.4 pounds water. Reducing this fuel to its carbon value, we have

11 pounds fibre equal to 51 per cent. of its weight in carbon	5.61 lbs.
1.6 pounds soluble solids equal to 42 per cent. of its weight in carbon672 "

Total carbon present in 22 pounds bagasse.... 6.282 lbs.

Now according to the best accepted results of experiments the calorific value of 1 pound carbon when burnt to carbonic acid CO_2 is equal to 14,500 British thermal units, or 14,500 pounds of water can be raised in temperature one degree Fahrenheit, consequently the perfect combustion of the bagasse resulting from the crushing and maceration of 100 pounds of cane would develop 91,089 British units of heat, which should evaporate to steam from 212 deg. Fahrenheit, just 94 pounds of water were it completely utilized, but as a considerable loss of heat occurs in the waste gases leaving the boilers, it is instructive to note the proportion that this loss bears to the total available heat in the fuel.

One pound of carbon requires for its combustion to carbonic acid 11.6 pounds of air, resulting gases weighing 12.6 pounds.

Furnaces in common use permit from two to three times the necessary quantity of air to pass through the fuel, diluting the products of combustion, reducing the heat in the

furnace and increasing the volume of the waste gases going up the chimney, and consequently the heat the gases carry off. Total heat lost in waste gases when no more than the necessary amount of air is admitted to the fuel is as follows:

Temperature in chimney 450 deg. Fahrenheit, 6,282 pounds carbon, plus 72,871 pounds of air, equals say 79 pounds of gases, heat required to raise these gases from 80 deg. Fahrenheit to 450 deg. Fahrenheit, equals 7,020 units (neglecting fractions).

Heat lost with a double supply of air to fuel, and same temperature in chimney equals 13,470 units, and with a treble supply of air to fuel the loss equals 19,930 units.

Then the loss in percentage of the total available heat in fuel, is thus:

With a single supply of air, loss is-----	7.7	per cent.
“ double “ “ “-----	14.6	“
“ treble “ “ “-----	31.8	“

This takes no account of the losses of heat due to radiation from the boiler and brickwork, or from infiltration of air through crevices in the boiler setting, but it shows very clearly how necessary it is that no more than sufficient air be permitted access to the fuel if the strictest economy is to be practised.

It must not be forgotten in this connection, however, that an insufficient supply of air is much worse than too much, because if carbon is burnt to carbonic oxide CO instead of carbonic acid CO₂, the thermic effect is only about two-thirds of what it should be, and this loss would have to be added to that in the waste gases.

The following experiments have been made in times past to determine the calorific value of bagasse under practical conditions, and it is satisfactory to know that the results obtained in this country have been fully corroborated by similar experiments carried out in France on tan bark, sawdust, ramie refuse, etc., a table of which has come to hand and is appended:

TABLE OF CALORIFIC VALUE OF FUELS OF VEGETABLE SUBSTANCES
FROM ACTUAL PRACTICE.

Date of Trial.	Kind of Fuel used.	Type of Boiler.	Moisture in Fuel.	Heating surface sq. feet.	Steam pressure lbs. per sq. inch.	Water evaporated	
						Per lb. of fuel.	Per lb. of dry fibre.
Ap. 25, '85	Saw dust and chips from saw mill.....	Elephant.....	13.36	p.c. 883	71.1	3.2	3.61
M'y 14, '85	Spent tan bark from tannery.....	Semi-Tubular..	55.0	p.c. 485	71.1	1.788	3.97
Jun. 3, '85	Oak chips from extract factory.....	Semi-Tubular..	62.3	p.c. 1,076.4	81.3	1.45	3.84
F'b. 28, '88	Refuse from Flax breaking.....	Elephant.....	29.5	p.c. 883	71.1	2.7	3.829
Oct. 16, '85	Pine sawdust.....	Multitubular..	33.75	p.c. 229.8	80.4	2.541	3.853
M'y 20, '88	Refuge from Ramie breaking.....	Elephant.....	10.59	p.c. 883	63	3-3	3.69
Mr. 2, '88	Bagasse from double crushed sugar cane.....	Flue and Tubular set tandem.	60.0	p.c. 1,694	65	1.873	3.348
	Kealia Mill, Kauai.						

Experiments to determine the value of bagasse as fuel when mixed with coal or crude petroleum :

Carried out March 2nd, 1888, at Kealia Mill.

No. 1. Duration of experiment 3 hours 48 minutes. Boilers, compound setting in brickwork; front boiler 24 feet long, six feet diameter, one Flue 44 inches diameter, containing ten Galloway tubes of a mean diameter of ten inches; back boiler 12 feet long, six feet diameter, containing 83 four inch tubes, ends of boilers about three feet apart. Course of gases through and underneath front boiler at same time, then through tubular boiler returning underneath tubular boiler about twelve feet to chimney flue. Total heating surface swept by the hot gases calculated as heating surface.

Total heating surface	{ 10 Galloway tubes.....	96 sq. feet.
Flue boiler	{ 44" Flue.....	265 " "
	{ Outside shell to heat....	225 " "
	{ 83 4 inch tubes 12' long	996 " "
Tubular boiler	{ Outside shell to heat..	112 " "

Total heating surface. 1694 sq. feet.

Grate surface, step ladder grates, 35 square feet, ratio grate surface to heating surface one to 48.4.

In this experiment crude petroleum from California was injected into the furnace by a steam atomizer, and from published data the calorific value is placed at twelve pounds of water per pound of petroleum.

Water evaporated per hour from 150 deg. Fahrenheit.....	6,098.6	pounds.
Fuel used per hour, oil.....	157	"
Bagasse containing 60 per cent. moisture.....	2,376	"

No. 2. Duration of experiment four hours, boilers the same as in experiment No. 1. Sydney coal of an estimated carbon value of 85 per cent. of its weight was used ; and shovelled into the furnace through the ordinary door.

Water evaporated per hour from 150 deg. Fahrenheit.....	5894.25	pounds.
Fuel used per hour, coal.....	228.75	"
Bagasse containing 60 per cent. moisture.....	2375.8	"

In both experiments the bagasse was fed to the furnace by a mechanical stoker, situated as shown in the drawings, on top of the brick furnace.

Water was fed into the boiler from a special measuring tank, and by a special pump, to secure reasonable accuracy.

Abstract of results, steam pressure carried 65 lbs. per sq. in.
Experiment No. 1.

Fuel used per square ft. of grate surface per hour, oil....	4.48	lbs.
Bagasse.....	68	"
Water at 150 deg. Fahr. evaporated per pound of oil estimated.....	12	lbs.
Bagasse.....	1.77	"
Water from and at 212 deg. Fahr. per pound of oil.....	13.148	"
" " " 212 " " " bagasse.....	1.939	"

Temperature of gases at base of chimney 440 deg. Fahrenheit, this is the average of a number of tests taken with a copper pyrometer, calculating the temperature of gases by the rise of a given quantity of water when a copper weight heated by the waste gases is cooled by the said water.

Experiment No. 2.

Fuel used per square foot of grate surface per hour, coal estimated value 85 per cent. carbon.....	6.536	lbs.
Bagasse containing 60 per cent. moisture.....	67.88	"
Feed water at 150 deg. Fahr. water evaporated per lb., coal estimated.....	8.00	lbs.
Feed water at 150 deg. Fahr. water evaporated per lb. bagasse.....	1.71	lbs.
Water evaporated from and at 212 deg. Fahr., per pound coal.....	8.76	lbs.

Water evaporated from and at 212 deg. Fahr. per pound bagasse.....	1.873 lbs.
Water evaporated from and at 212 deg. Fahr. per pound of dry fibre and solids in juice remaining in bagasse	3.346 lbs.
Water evaporated from and at 212 deg. Fahr. per pound of equivalent carbon, Coal reduced to carbon.....	10.306 lbs.
Bagasse reduced to carbon.....	6.69 "

Kealia Mill in which these experiments were carried out, used at this time double crushing and maceration, the diffusion process was in the course of being erected.

The drawing illustrating the boilers at Kealia is of those at present in use with the diffusion process, the one which was used for these experiments not being required is not now in use.

STATEMENT OF BAGASSE AND COAL BURNED DURING THE CAMPAIGN

1891-1892, AT KEALIA MILL.

Total weight of cane worked up.....	109,564,300	pounds.
Dry fibre in this cane at 11 per cent.....	12,052,073	"
Total weight of bagasse burnt, containing 58 per cent. moisture.....	28,695,412	"
Total weight of coal used during the crop	3,454,080	"
Total weight of commercial sugar made	14,100,000	"
Time consumed in working off the crop.....	3,672	hours.
Average polarization of commercial sugar.....	98	per cent.
Average dilution of the diffusion juice 24 pounds water per 100 pounds normal juice.		
Average density of normal juice.....	18.5	per cent. Brix.
Average extraction of sucrose from that in cane..	96	per cent.
Coal used per ton of cane.....	63.05	pounds.
Coal used per 100 pounds of cane.....	3.15	"
Coal used per ton (2,000 lbs.) sugar.....	490	"
Sugar made per hour's run.....	3,840	"
Bagasse burnt per " ".....	7,815	"
Coal burnt per " ".....	941	"
Bagasse burnt per furnace per hour.....	1,953 $\frac{3}{4}$	"
Coal burnt per " ".....	235 $\frac{1}{4}$	"
Bagasse burnt per square foot grate surface per hour.....	43.4	"
Coal burnt per square foot grate surface per hour.....	5.2	"

EQUIVALENT CARBON VALUE OF FUEL BURNT PER SQUARE FOOT OF GRATE SURFACE PER HOUR.

Carbon value of the dry fibre estimated at 51 per cent of its weight.	}	Fibre -----9.3 pounds.
Carbon value of the coal estimated at 85 per cent. of its weight.		Coal-----4.4 “
Carbon value of soluble solids in cane juice estimated at 42 per cent. of its weight.	}	Sugar, etc....0.011 “
Total carbon per sq. ft. grate surface per hour.		13.711 pounds.

It is but just at this stage of this report to notice the date of the introduction of the tandem compound boiler, which was first planned and adopted by the Hon. Robert R. Hind of Kohala, Hawāii, in his Sugar Mill at Makawao, Maui, in the year 1869; the setting of this type of boiler is illustrated in the drawing of the Honuapo boiler, and the superiority of this design of setting, over what was then in use, was so fully demonstrated, that up until 1880, this plan was largely followed.

The results which appear in the first six trials in the table are due to experiments conducted by eminent French and Belgian engineers, which were published in “Engineering” of September 20, 1889, and were carried out with the Godillot furnace which is furnished with step ladder grate bars of a pyramidal form, not unlike the system which is in common use in this country; the seventh experiment was carried out at the Kealia mill the details of which appear in this report.

Efforts have been made to utilize the waste heat escaping up chimnies, notably by Mr. Alexander Young in his patent exhaust steam superheaters and by Messrs. Marsden and Rickard in their patent juice evaporator, which is worked by the waste gases being drawn through copper tubes set in a suitable vessel which contains saccharine liquids to be concentrated.

The superheaters have been introduced in a number of mills in this country and it is reported with very fair results, but as far as is known no data of an exact nature has been published respecting this adjunct to our mills.

Messrs. Marsden and Rickard's juice evaporator has not as yet been put into practical operation, but the following re-

sults of an experiment on a small scale carried out by the Union Iron Works Co., will show that a considerable saving of heat would attend its adoption.

The apparatus consisted of an old clarifier drum about five feet diameter filled with 2" brass tubes two feet long the most of which were plugged up, this was connected to the shop chimney by a smoke pipe 10" diameter, and a steam exhaust-er was used to draw the waste gases from the chimney through the tubes and eject them into the air, the experi-ments were continued for a number of days and the results in evaporating water are as follows :

Temperature in stack.....	450 deg. Fahr.
" " escape.....	250 " "
Mean " " heater.....	350 " "
Water evaporated from 212 deg. fahr. per hour.....	20 pounds.
Total heating surface to waste gases in sq. ft.....	45.8
Water evaporated per square foot per hour....	.437 pound.
Transmission of heat in British thermal units per square foot heating surface per hour....	422 t. u.
Per degree difference of temperature per square foot per hour.....	3.06 t. u.

It will be seen then that by experiment, Messrs. Marsden and Rickard's Evaporator will with gases of 450 deg. Fahr. temperature evaporate, say a half a pound of water per square foot per hour; this amount of water evaporated from the juice is equivalent to a saving of one pound of steam from the main boiler, because there is available one half pound more of steam to be used in concentrating in the triple effect, and one half pound less of water to be evaporated out of the juice for every square foot of heating surface used under that system, and as average coal evaporates 8 pounds of water to steam, so eight square feet of heating surface in the evaporator is equivalent to a saving of one pound of coal per hour.

The attached drawings of boilers and furnaces show the development of the bagasse furnace from 1880 to the present time; in the best boilers the proportion of grate surface to total heating surface in contact with the gases of combustion varies from 1 to 30, to 1 to 45, and the ratio of the grate surface to furnace volume varies from 1 to 4, to 1 to 6,

in the most successful furnaces. It is a matter of fact, that to successfully consume green bagasse or exhausted diffusion chips, immediately on leaving the rollers, the furnace volume should be large enough to admit of a thorough admixture of the gases of combustion before they reach the bridge wall, and experience shows that this ratio (grate surface to furnace volume) should not be less than 1 to 5. It is also of the utmost importance that the furnace should be surrounded by a heat radiating surface rather than a heat absorbing surface, because, if the gases are cooled down below the temperature of association, which has been placed at not less than 2,500 deg. Fahrenheit, carbonic oxide is formed instead of carbonic acid with a very serious loss of thermic effect.

This is shown in the design of the Naalehu boiler, here the furnace is cramped and surrounded on all sides by iron in contact with water; and again in the Honuapo boiler which has plenty of room in the furnace, but the boiler surface immediately over the burning fuel absorbs the heat so that complete combustion of the damp fuel cannot take place; nearly all the boilers in this country are now set as shown in the drawings illustrating Paauhau and Kealia boilers and the results are satisfactory.

The principles that underly the construction of furnaces that use coal can be applied with success to furnaces for burning bagasse as respects the amount of carbon that can be burnt per square foot of grate surface per hour, but strict attention must be paid to the proportion and construction of the furnace itself as respects its volume compared to the grate surface, and the materials of which the furnace is built, if an efficient apparatus is to be expected.

Signed.

J. N. S. WILLIAMS, Chairman.

J. B. ATHERTON.

—:O:—

REPORT OF COMMITTEE ON FORESTRY.

To the President of the Planters' Labor and Supply Company:

SIR:—The subject of Forestry possesses far greater importance to the welfare not only of sugar planters and other agriculturists, but of every inhabitant of this country, than has yet been fully recognized. Hawaii is historically too young to

supply us with such lesson of experience regarding the uses of natural vegetation, as we obtain from Europe, Asia, and the cleared lands of America. Their teaching is almost invariable and indisputable. If forests are destroyed without replacement, the hydrometrical conditions are entirely changed. The exposed soil, deprived of cover from the sun, consequently dried and heated, loses its valuable power of cooling into condensation the masses of vapor which pass over it in the shape of clouds: not only is the amount of rain-fall thus diminished, but the means of preserving from evaporation such rain as does fall is lost. This is a matter of simple physics, which every school-boy can understand; but its tremendous import to all of us is not generally realized. If it were, forest preservation would by this time have been the subject of far more special and strict legislation than yet exists upon our statute books. Mineral resources we have none; the ownership of a few harbors of such geographical position as makes them useful commercial entrepots and ports of call for shipping is at best of only limited value to us; the possession, however, of a richly fertile soil, which if cared for, will continually draw from the wealth laden clouds their constant distribution of vitalising rain must always be the most influential element in the economic prosperity of Hawaii.

Assuming then the important character to this country of its agricultural possibilities, we have to inquire how we are treating or mal-treating the conditions of willing soil and ceaseless rain-clouds which nature has provided for us.

The clearing of lands for sugar cultivation has probably not caused to any great extent a lessened attraction of rain; the ground is certainly cleared of natural growth, but it is then thickly recovered over most of its area by sheltering vegetation; and this process takes place only on the lands of lower elevation, up to a height to which sugar canes may be successfully grown; coffee planting and other agricultures, in the same way, replace one vegetation by another, and rice fields take the place of useless marshes. It is to be hoped, however, that the agriculturist, who is, for his own best interests, maintaining the soil in a state of productivity on the lower lands, will not fail to realize the less direct but not less

important interest which the tree-covered uplands possess to him, to his successors and to the state.

Believing that the value of forest as a collector and conserver of moisture is generally admitted, this committee has endeavoured to obtain information especially upon the condition of the woodlands of the country, and as to the natural and other causes which may be affecting their increase or decrease.

In Hawaii (as to districts of Kohala, Hamakua, and Kona), in East Maui, in Molokai and in Kauai, it appears that forestland is being steadily reduced in area through destruction by cattle. In some neighborhoods, especially in Maui, insects seem to have their share in warfare against the trees; but it is likely that, as Mr. R. W. Meyer of Molokai, a learned and careful observer of natural history in this country, suggests, the destructive insects appear where the dense shade and dampness of the ancient forest has been interfered with by other invaders. The following is a brief summary of reports made by some of the gentlemen who have kindly corresponded with the forestry committee on the subject. In the northern portion of the Kohala mountains much forest is being destroyed by cattle, there are no insects. The forest in Kawaihae-uka is rapidly decreasing; in six years there will be hardly any trees left; cattle are the cause. Cattle are "the most powerful factors" in the denudation of the Waimea, Hawaii, neighborhood. Wild cattle are detrimental to forest trees and wild coffee in North Kona, Hawaii. In the Kula country, Maui, in twenty years, a dense forest has been almost cleared by insects and cattle. In the Makawao neighborhood, the forest is disappearing for the same reason. In East Maui, during fourteen years, the forest has receded two to two and a half miles all the way from Haiku to Huelo; beyond Huelo and Kailua, where cattle are not kept or cannot get, there is a close and healthy forest. In the south of Kauai, the forest is being gradually destroyed by cattle, fires, etc. In Molokai, the chief cause of the destruction of the forest has been cattle.

It is due to many land-holders who are graziers, or upon whose estates wild cattle exist, to state that great efforts have been made for the checking of this needless destruction.

The Forestry Committee has had communication with but a few, comparatively speaking, of the controllers of woodland districts; and it is fair to suppose that many persons whose opinions we are unable to quote are carefully endeavoring to prevent such ravages as those which we have indicated, and to preserve, and if necessary restore, forest growth. In North Kohala and elsewhere, it is gratifying to note the efforts made by owners of grazing lands to fence in large extents of forest for their security against cattle. The result is quickly apparent, as in the case of an enclosure about five years ago by the Pacific Sugar Mill Co., on the Kohala mountains above Kukuihaele. Several correspondents allude to the success of this enterprise; Mr. George Renton says "the result is now apparent to anyone; young trees are springing up everywhere, and in ten years the enclosure will probably be more thickly wooded than any other portion of Hamakua." It seems to be clear that the indigenous vegetation of the Hawaiian mountains requires but little protection for its continued existence, and it is to the natural clothing of these mountains that we must first look for the maintenance of necessary water supply. Mr. McBryde (Kauai) states that in some of the mauka lands, where there are no cattle, and where the ground is covered with indigenous ferns, weeds and grasses, young koa trees are coming up thickly and growing in a most luxuriant manner. Mr. Colville (Maui) reports, in proof of the desirability of fencing against cattle, that fifteen acres near Paia, lately enclosed now contain a fine forest of young and prosperous koa trees.

Insects, blight and such vegetable invaders as lantana, mimosa and some grasses are minor, though not in considerable foes to forest growth. Mr. Meyer, as we have said, speaks of a bark insect, "black scale," as have been occasionally destructive in Molokai, but as being probably encouraged by the thinning of woodland and consequent loss of damp shade: if Mr. Meyer's supposition is correct and cattle open the way for insects, it is reasonable to suppose that the preservation of woodland from the incursions of cattle would tend to the banishment of borers. In 1888, Mr. Morrison, then stationed at Spreckelsville, furnished the committee with his careful observations of the work of a tree borer, which he thought

was responsible for the destruction of many of the forest giants; and Mr. L. von Tempsky of Kula, Maui, attributes much havoc in a formerly dense forest of koa, mamane, ohia and other trees to insect ravages; one borer he describes as a white grub with dark head, armed with a very powerful pair of nippers, and able to cut to the centre of the toughest tree. Mr. Goodale of Papaikou informs us of insect attacks upon trees in Hilo district, and of the efforts made by Mr. D. H. Hitchcock to preserve fruit trees by painting them with tar and other preparations. For the purpose of checking these onslaughts, Mr. von Tempsky suggests the introduction if practicable of birds of the woodpecker class, which search for their food about the trunks and branches of trees. This suggestion, as well as the consideration of the desirability of preserving indigenous birds of the country, deserves the serious attention of agriculturists: Mr. Morrison was so much impressed when at Spreckelsville by the hurt which might result from the destruction of our feathered friends that he prohibited to a great extent the shooting of small birds.

The various blights, appearing from time to time, which are hostile to useful vegetation do not seem to have affected indigenous wild trees to generally serious extent; their detrimental effect upon introduced and cultivated plants might probably be met by the investigation of similar visitations in other countries; and with as great success as that which has attended the enquiry two years ago as to the cottony cushion scale.

The lantana of which mention has been made in former reports of this Committee, continues to spread with vigor in almost all districts of this country; Puna, as Mr. Rycroft believes, and Kula, Maui, according to Mr. von Tempsky, being happily free from the invasion. Where it attacks cultivated ground, or intrudes into land already wooded, its eradication is no doubt desirable. Mr. Lowry and Messrs. Gay and Robinson, for our 1888 report, described the process adopted by them in meeting the difficulty. The young plants lightly rooted are without difficulty pulled up; the older plants are cut off near the ground, and a few drops of kerosene oil are poured on to the exposed wood of the remaining trunk, after which the roots perish. Mr. R. W. Meyer and Mr. Colville clear their

arable and pasture lands of lantana twice a year. As the committee suggested in 1888, the lantana is probably not without economic use, if it can be restricted to valueless or only slightly valuable land; but this restriction is of course the difficulty which presents itself; and no remedy seems to exist except the careful clearing of young plants where they can be reached. Moreover, where lantana is not interfering with any other growth, it is as Mr. McBryde points out, providing the seeds of mischief elsewhere. This gentleman writes that some landowners do not clear their lands at all, or do it so little that it amounts to nothing, giving as reasons that the clearing would cost more than the land is worth; whilst others after constantly and diligently clearing, find themselves constantly injured by the proximity of what are in effect nurseries for propagating the plant.

Of some economic service rendered by the lantana Colonel Spalding speaks as follows, in a very interesting letter with which he has favored the Committee; "I think no one will dispute the right of the lantana to be regarded as in the front rank of 'noxious plants,' and yet I am by no means sure that this interesting individual has not been maligned. Having had over twelve years experience with the lantana on Kealia, I am not prepared to say that it has been altogether an evil. The dying out of the kukui trees, some years ago (a circumstance I cannot attribute altogether to the cattle) left our middle lands on foot-hills bare and exposed. In many places the soil was soon washed from the surface, and these lands became unfit even for pasturage. The lantana came and stayed. Naturally it has kept out of the cane fields, and only allowed to extend itself over these middle lands that had been denuded and rendered almost worthless. It has continued to grow mauka, to some extent, but our best pastures on the upper lands are comparatively free from it. Now I find that the lands where the lantana has had its home for years had gained in strength of soil, and the cattle find good grass wherever they can push through the bushes. I attribute this to the fact that the thick bushes prevent the hot rays of the sun from drying up the ground, and serve to retain the moisture which causes decomposition of fallen leaves, and vegetable matter, adding to the strength or richness of the

soil. I expect to see the lantana die out in the near future, and leave these lands in such better condition than if it had never grown."

Granting that the plant in question is to a certain extent useful, it seems likely that it will establish and take care of itself where it is wanted; and too great efforts cannot be made to keep it in check; for in a balance of advantages and disadvantages the latter will be found in most districts to predominate.

Colonel Spalding mentions another weed in the following extract: "We find the beautiful and interesting 'sensitive plant' much more of a nuisance in our cane fields, than any other of the so-called 'noxious plants.' If any planter has not been obliged to make its acquaintance let him thank his good fortune and give it a wide berth. If he already has it with him let me tell him our remedy, and perhaps he may find profit in following our example. As soon as the cane is cut from a field that is to be given rest we turn in our flock of sheep and let them eat all the green stuff, including the aforesaid 'sensitive plant.' During the period the field has to lie fallow we repeat this operation as often as the sensitive plant makes its appearance. The sheep thrive upon it, and eat it very clean. I have found them so valuable in this line that I tabooed their being killed until such time as their increased numbers more than sufficed to eat up the sensitive plant, and we now have a superior quality of mutton without interfering with our regular pastures."

The Jooi, an alien hated by the ploughman, is reported by Mr. E. P. Low and Col. Spalding as disappearing, the former says that Hilo and other grass are its successful opponents in Kohala.

Mr. McBride describes a long-rooted grass called Laike, or Pili-haole, as an enemy especially of the shallow-rooted trees and of seedlings plants; with both roots and stems it packs the ground, destroying the older trees gradually and choking the seedlings. It would be interesting to know whether in other districts besides Southern Kauai this enemy has been encountered.

The following information is interesting in its evidence that many efforts are being made to maintain and increase the wood land of the country.

In Kohala, Dr. Bond, Mr. Kynnersley, Mr. Hind and others have devoted considerable attention to tree planting, Dr. Bond having placed 20 acres of land under ironwood, eucalyptus and black wattle. Mr. R. Hall has planted several acres near the coast with Pahala, for use as a break-wind, in checking saltspray, and in retaining moisture. Mr. E. P. Low and others have planted Algaroba on the lower slopes of Western Kohala, and this gentleman says that he thinks ten years will cover the coast, from Mahukona to Kawaihae, with the useful Algaroba. On the Kohala mountain, where cattle are excluded by fencing or driven away by Hilo grass, thousands of Ohia and Nenelean trees are growing abundantly, with greater success than other trees which have been tried. Mr. Goodale states that lands cleared for sugar but abandoned on account of elevation are being covered naturally with Nenelean and other plants. In Hilo district, in Puna and in Kona, coffee trees have been the principal addition to arboreal vegetation, Mr. D. H. Hitchcock having planted also cocoa and camphor trees. In Puna, Mr. Rycroft says, the forests are holding their own; land where wood has been cut being soon abundantly covered again with ohia. From East Maui Mr. von Tempsky writes as follows: "I have planted quite a number of trees myself, and also largely distributed seeds and seedlings to the homesteaders and natives of this district; I have planted and growing, eucalyptus of seven or eight different sorts, three or four kinds of wattles and acacias, ironwood, English oaks, native koas, mulberries, pines, fir-trees, etc. The mulberry is the most rapid of growth, next to that the red wattle, and the latter I think is the best tree for the district, as the wood is valuable for firewood and fenceposts and the bark invaluable for tan purposes." The same gentleman says that if the Government had made necessary the planting and maintenance of a certain number of trees to each acre by homesteaders, they would have been not only a benefit to the country but a source of income in future to the people. In Kauai a good deal of systematic planting has been done by the Lihue Plantation and Mr. G. N. Wilcox, koa trees being amongst their satisfactory growths. Colonel Spalding alludes to camphor trees which he has planted as having been very successful, adding

"I do not think the cultivation of cane and the manufacture of sugar can be replaced by camphor to the advantage of our country." In Molokai, Mr. Meyer has found successful on the low Kona lands the algaroba especially, the monkey-pod, inga, grevillia robusta and others, and on the higher lands, Monterey cypress, several kinds of Australian acacias, wattles, etc., grevillias, several of the eucalyptus family, and pride of India (where there is not too much wind). The eucalyptus family are alluded to by a correspondent as being undesirable neighbors for cane fields by reason of the amount of moisture and nutriment they absorb from the soil: but it appears that in situations where they cannot be thus hurtful they are favored as trees for shelter and shade and for traditional hygienic effect.

A former report by the Forestry Committee has urged that the subject now dealt with is of so great public gravity that it might advantageously become the care of a special sub-bureau of Forestry, or Forestry and Agriculture. We strongly support this proposition, and believe that such a department of Government might be maintained, at small expense, with results of immense benefit. Possibly the establishment of a Board of Honorary Commissioners, having means and authority provided them for the employment of a small staff of inspectors might be all that is required. Such a sub-bureau would afford a centralised means of dealing with blights and obtaining and diffusing information as to their remedies, and of helping powerfully and intelligently the very important work of preserving for this country a sufficient amount in the different islands of the rain-drawing and moisture-conserving woodland, a task in which the largest amount of public spirit and liberal expenditure on the part of private individuals can do but little without organized effort and systematic co-operation. It has been pointed out by several correspondents, too, that the Government and the Crown Commissioners have it in their power to do a great deal towards forest maintenance by making leases and homestead-grants conditional upon the discharge of reasonable and inexpensive duties as to the planting and preservation of trees; they should moreover consider the desirability of retaining under their own control for preservation under forest of lands suitably situated for

the purpose, even perhaps of obtaining the control of other such lands; the rental of the upper country is for the most part small in comparison with the benefit to other tracts which would be gained by the maintained and probably increased water-supply which it is expected this course would secure.

It is a source of regret to this Committee that the cutting of the Tantalus Road has necessitated so much destruction of trees in the interesting and beautiful experimental forest on the Makiki hills; and we do not think that the consideration of rental for the woodland will justify the Government in permitting a further clearance by the lease of building lots in this forest. It is greatly to be hoped that the plantation will be allowed to thicken and spread.

In closing our report, we offer our sincere thanks to the many gentlemen who have kindly assisted us with careful and detailed statements upon the various points we have mentioned; and we venture to say on behalf of our successors that they will at all times highly appreciate correspondence with any who will kindly take the trouble to afford them further information upon the subject of Hawaiian Forestry.

THOMAS RAIN WALKER, Chairman.

—:o:—

REPORT OF COMMITTEE ON FRUIT CULTURE.

To the President of the Planters' Labor and Supply Company:

SIR:—On behalf of the Committee on Fruit Culture, I regret that time has not been available in which to make a more exhaustive report upon all branches of the subject in this country. Former reports have however, covered the general subject quite fully, and this report is therefore confined to an industry which has practically come into existence during the last year, viz.: the raising for export of pineapples.

Prior to 1890, there was practically no export of pineapples. A few were exported in 1890 and in 1891, the Custom House records mentioned 216 boxes of pineapples as having been exported to San Francisco, this being approximately 5,000 of the fruit. The export was so small that no separate

record was kept as distinguished from other sundry fruit, and there were probably a few more under the general heading fruit, which the Custom House statistical clerk has been unable to identify. In 1892, the pineapple export had increased so that specific statistics were kept, the records showing up to date 15,959 pineapples and 907 boxes of pineapples. The boxes contain approximately 24 fruit each to a box. This would give the total export up to date during the present year 37,727. From figures given me by shippers, there have probably been somewhat more than this which have not been noted in the Custom House statistics and the approximate export of fresh pineapples for the year may be put at something over 40,000. The fruiting season of pineapples at the Islands is from the latter part of May till early in September, although there are scattering fruit during other months.

Enquiry among those interested in the pineapple industry here shows a very marked increase in the business, with the immediate prospect of enormous expansion.

The following statement is believed to include all of those who are making a business of cultivating for sale who have over 1,000 plants, except those who are located in the district of Kona, Hawaii, who I have been unable to communicate with in time to incorporate the returns in this report. When received I will submit it in the form of a supplement hereto.

First. Mr. John Ena, of Honolulu, has two pineapple plantations in Manoa Valley, four miles from Honolulu, and has planted in 1891-2 23,000 plants, 4,000 of which are imported through a New York house, the plants coming from Trinidad, Porto Rico and Jamaica. The invoice of imported plants called for 4,500 plants. 500 were lost in some manner on the route, and of those which arrived all grew but one hundred. The cost of those which were received averaged twenty cents apiece. The plants imported are of seven different varieties. Mr. Ena expects to put in 25,000 more plants in 1893.

Second. Mr. E. W. Jordan has a plantation of 20,000 plants in Nuuanu Valley, about two miles from town, of which 7,000 are imported, of twenty-two different varieties. Mr. Jordan has imported from nearly all over the world in order to experiment on the best kind. He has imported from Jamaica, Singapore, Bahama, Samoa, Australia and the London Hot

Houses. He will not increase his plant in Nuuanu Valley for the present. Practically all of his fruit has been exported to the Coast, the market here not being large enough to cut any figure in the sales. The price of pineapples at the Coast at wholesale ranges from \$1 to \$6 per dozen according to quality and season. The pineapples forwarded early and late in the season bringing good prices, but in the middle of the season, sometimes not bringing cost. His average receipts for the native pines was from 71 cents to \$1.25 a dozen. Mr. Jordan's first shipment this year was on May 24, and the last on July 20th.

Mr. Jordan thinks that the rapid increase in the number of pineapples now being planted is going to glut the San Francisco market, so that the only method of disposing of the surplus crop will be by canning. He is in favor of a co-operative cannery, as he does not think it will pay for each canner to can separately on a small scale.

Third. Mr. E. W. Jordan and Mr. S. M. Damon have a plantation at Moanalua, three miles from Honolulu, of 12,000 plants, and expect to put in 24,000 more plants during the coming year. These are nearly all imported.

Fourth. The Pearl City Fruit Company is a limited liability corporation, engaged in fruit culture at Pearl City. They planted 15,000 imported pineapples in 1891, and have put in approximately 25,000 during 1892, and will probably double their plant in 1893.

Fifth. The Woodlawn Fruit Company is also a limited liability corporation with a plantation at Pearl City. The corporation has a capital stock of \$30,000. The company has just received an invoice of approximately 50,000 plants from the Bahama Islands, and will probably largely increase their plant in 1893. The company has secured the services of Mr. George Burnside, an expert pineapple raiser from Bahama. Mr. C. J. McCarthy, secretary of the company who was formerly engaged in the wholesale fruit business in San Francisco, states that they hope to be able to work up the trade in California for fresh fruit, so that they can sell a large quantity at a considerably lower price than that now charged, and by selling by the quantity be able to make a profit where there is now a loss on small lots. The present average price

of a good pineapple at retail in San Francisco is 75 cents. Mr. McCarthy believes that by selling in quantity they can be retailed at 25 cents a piece at a profit. Even if this is done there will probably be a large surplus which will have to be canned. The company has made careful calculations and believe that pineapples can be canned and sold in the States at a figure which will cover expenses, with a bare margin for profit as long as the present United States duty of 35 per cent. is charged. If the duty is removed, it will leave a margin for a handsome profit. The company are going ahead with their investment upon the faith that the Hawaiian Government will succeed in negotiating a treaty with the United States by which preserved pineapples will be admitted duty free.

Sixth. Mr. J. L. Torbert and W. R. Sims have a small plantation at Pearl City, now consisting of 1,000 of the choicest variety, known as the smooth leaf Cayennes, which were imported from Florida. They will plant 5,000 more of the same variety in 1893. They have to irrigate the plants about once in three months during the summer.

Mr. Tobert favors a co-operative cannery, which he stated he would be willing to take stock in, although he thought that for the immediate present, he could dispose of all the fresh fruit which he had, as the variety which they are raising is a very large choice variety meeting with ready sale.

The leaves of this variety of pineapple have no thorns, and are used for making fibre for the pineapple or pina cloth. Mr. Torbert has had some specimens from his Pearl River plants run through a fibre machine producing a very superior article of fibre about two feet in length. He proposes to prepare a merchantable quantity and get quotations thereon, with a view to developing that line of business.

Seventh. Dr. G. Trousseau has a plantation at Diamond Head of 2,000 plants of three or four choice imported varieties, which have been received during the past year from Florida. The doctor is desirous of forming a company and largely increase the plant next year, as he has a large area of land well suited for the purpose.

Eighth. Kaluhilaaau has a plantation in Nuuanu Valley, above the upper reservoir of 5,000 imported and 5,000 native

pineapples. The imported ones are of choice varieties imported from Florida. He will not increase his plant next year as his land is now about full.

Ninth. Mr. John Kidwell has a plantation of approximately 50,000 plants in Manoa Valley, almost exclusively of the variety known as Queens and smooth leaf Cayennes. Mr. Kidwell is practically the pioneer in the business of exporting pineapples from the Islands. He has imported and tried over thirty different varieties and has discarded them all except the two varieties above mentioned, which he considers far superior to any others. He exported to San Francisco 30,000 pineapples during 1892. He will not increase his number during the coming year as he expects to expand as rapidly as possible at the plantation of the Hawaiian Fruit and Packing Company mentioned hereunder at Ewa. Mr. Kidwell states that he considers that the output for 1893, is going to be far in excess of the Pacific Coast consumption of fresh fruit and is making preparations to can about 10,000 pineapples during 1893. He states that there is a bare margin of profit after paying United States duty. There is a question whether it would not pay better to let the pineapple rot rather than can them but he proposes to make the experiment in hopes that treaty relations may have been made by the United States by that time which will let canned pineapples in free of duty. Mr. Kidwell thinks that the increase in the number of pineapples exported will warrant the steamship companies in providing better ventilation facilities as there is now frequently a heavy loss from decay of fruit.

Tenth. The Hawaiian Fruit and Packing Company, a limited liability corporation with a capital stock of \$40,000 is just starting a plantation at Ewa, Oahu. They are boring an artesian well and putting in a pumping plant and will put in 100,000 plants during 1893, all of the imported Queens and smooth leaf Cayennes varieties. Mr. Kidwell and Mr. J. Emmeluth are the principal stockholders. The company is getting its plants from Mr. Kidwell's Manoa plantation. The company's plans are not yet fully developed, but they will probably put in 200,000 more plants during 1894, if the treaty relations with the United States are such as to warrant the expansion.

The company are making preparations to put up a preserving factory both for canning and preserving in glass.

Mr. J. Emmeluth has been for three years last past canning pineapples in small quantities both in Kona and Honolulu, experimentally. These have been sent in the successive years in small lots to different points in the States. He has sent 50 dozen three pound cans to Boston, 80 dozen to New York, 250 dozen to San Francisco, and 6 dozen to Victoria, B. C. The prices realized have been quite uniform. For two years in succession the New York price was \$2.35 per dozen. In Boston the price realized was from \$2.15 to \$2.35 per dozen; in San Francisco the price received was \$2.25 per dozen; the shipment to Victoria was unsatisfactory. The returns from Boston average 96 cents a dozen after deducting freight, duty and commissions. The average returns from San Francisco after deducting the same items of expense was \$1.06 per dozen. The shipment to New York netted \$1.15 per dozen.

These figures did not pay the cost of canning pineapples here, Mr. Emmeluth's loss having been about \$400 out of an expenditure of \$2,000, but the advices to him both from New York, Boston and San Francisco were that if the market was supplied in quantity there would be a drop in the price not to exceed 15 per cent., but that at that price, the market would be almost unlimited; Messrs. C. Brewer & Co., advising him that they could place a shipload every three months in Boston alone, provided a good article is furnished. Mr. Emmeluth estimates that upon the quotations received, there will be a slight margin over expenses after paying United States duty, with strict economy and careful management, and that if the United States duty is taken off, there will be a handsome profit with almost an unlimited market for all the pineapples that can possibly be raised at the Islands for years to come.

The pineapples which have been forwarded by Mr. Emmeluth heretofore, have been canned both whole and in slices. The whole pineapples are preferred. The size of the can has limited them to three pounds heretofore, and a larger pineapple would probably bring a proportionately larger price.

Eleventh. Mr. Chas. Wilcox has been one of the largest exporters of pineapples during the year 1892. He has a plan-

tation at Makena, Maui, of 20,000, all native pines. He has added 15,000 during 1892, of which 5,000 were imported from Mexico. He expects to put in 10,000 more during 1893 and plans to increase his plantation by 50,000 more in 1894.

He exported 8,000 pineapples in 1891, and 23,000 in 1892. The time during which he exported was from the latter part of May to early in September. His average receipts after deducting California charges, were eight cents each. The exports during the height of the season during July and August netted him an actual loss, all of the profit being made off of pineapples sent at the beginning and end of the season. He stated that he did not propose to ship any during next July, preferring to let them go to rot on the fields than have to pay a bill of expense upon shipping them to California. Mr. Wilcox would put up a cannery if the United States duty were removed, but from his present information sees no hope of canning profitably with a 35 per cent. duty to fight against. Mr. Wilcox has bought a number of the fruit which he has exported from native planters at Makena, and says that if a market was found there could be an immediate and very large increase of production in that vicinity.

Twelfth. Mr. Antone Rosa has a plantation in Kalihi valley of somewhat over 1,000 plants, about one-half of which are the imported variety. He will increase largely next year if there is any prospect of a cannery being started which will provide a market. He has sold all his pineapples raised this year to parties exporting to San Francisco, but in the middle of the season the price received was low.

Thirteenth. Mr. Camarinos of the California Fruit Market has a plantation at Kalihi-kai of 50,000 plants, all of imported varieties, and intends to put in 100,000 plants more during 1893. Mr. Camarinos has a wholesale fruit store in San Francisco, and says he has had no difficulty in disposing of all his fruit at profitable rates, and does not think he will have any difficulty in doing so with his increased crop. With his facilities for handling his output, he does not expect to be obliged to can at all.

I regret very much that figures of the Kona production are not available for incorporation herewith, as this is the district which has heretofore produced most of the pineapples raised in the country.

A summary of the foregoing, showing the pineapples now in the ground, and those proposed to be planted during 1893, is as follows :

Pineapples in the ground in 1892, exclusive of Kona.	294,000.
Pineapples in the ground and proposed to be added in 1893.....	585,000.

This is exclusive of the statements made by several planters that they would increase if a favorable market offered, but who are unable to give figures as to what number they would put in in such event.

With the number of small planters who are not enumerated herein, and the number who are interested in the business, but have not yet actually embarked therein, there can be no doubt that the abrogation of the United States duty would cause a million plants to be put in during the year 1893.

Recognizing the advisability of fostering this industry, there is now before the Legislature a Bill proposing to remit all taxes and duties on pineapples and the machinery and appurtenances used in preserving the same, which will probably become law.

The one great barrier, however, to the industry becoming one of the leading articles of export is the present United States duty of 35 per cent. on the preserved article. If the Government can succeed in negotiating a Treaty with the United States, by which this duty can be removed, an enormous business will be created almost immediately, as the plants come into bearing the year after they are planted. The importance of establishing this industry cannot be over estimated, as it is a business which lends itself naturally to small farming, and with a cannery in Honolulu at which small producers could sell their pineapples for cash it would revolutionize the character of the population around Honolulu, and for that matter throughout the Islands, for pineapples grow almost equally well in the rainy district of Hamakua, and the dry districts of Kona and Ewa.

PINEAPPLE INDUSTRY IN THE BAHAMA ISLANDS.

I quote herewith by the kindness of Mr. H. W. Severence, United States Consul, from the report of the United States

Consul McLain of Nassau on the pineapple trade in the Bahama Islands, as follows :

From the April Consular report of 1891 :

"The pineapple crop of 1890 was abundant, well handled, and realized good prices. The number shipped was 476,000 dozen, worth \$242,000, against 283,000 dozen worth \$124,000, in 1889. Fertilizers were used largely during the last year from which old and failing plantations derived signal benefits. For years planters had derided the idea of using manures on their fields, preferring to abandon them and see fresh soil; but all this is now altered. Previous to 1889, little fertilizer was imported, but during that year 950 barrels were bought, costing \$5,000. In 1890 nearly 2,000 barrels were imported costing \$11,000, all coming from the United States. By a judicious use of fertilizers, the old fields are made as good as new, the fruit is larger and better, and the outlay is decreased perceptibly."

From the June Consular report 1892 :

"The pineapple crop was good, but the demand was scarcely equal to the supply and prices ranged lower than usual. The quantity exported in 1891 was 510,408 dozen, which were invoiced at \$224,000. Fertilizers to the amount 2,175 barrels worth \$12,000 were imported from the United States and used during the year.

There was a decided decrease in the quantity of canned or preserved pineapples shipped during the year, only 17,000 cases being exported as against 27,000 cases in 1890. The export in both years went to the United States. Packers of this fruit here say they can no longer compete with the American factories now that the ripe fruit is admitted duty free into the United States, while there is on preserved fruit a duty of 35 per cent. on the foreign product."

The following article on the subject is attached hereto as it gives a considerable amount of detail information upon the conduct of the business in Bahama, now believed to be the largest pineapple exporting country in the world.

L. A. THURSTON,

Chairman Committee on Fruit Culture.

[The article referred to, "The Pineapple Trade of the Bahamas," is omitted for lack of space, but will be printed later.]

REPORT OF COMMITTEE ON RAMIE.

To the President of the Planters' Labor and Supply Company:

SIR:—Ramie is the plant from which the beautiful grass cloth is made in China, which resembles silk in its gloss and linen in its strength,—one of the finest products for wearing ever produced. There are two varieties—the white, which is grown chiefly in China, and the green, known as the Java, and which I am informed is the variety introduced here. It is more easily cultivated, and grows more rapidly, reaching maturity at an earlier period. The plant is a species of nettle, and in favored, well-watered localities will attain its full growth of six or seven feet in four months from the planting, and yield three or four crops in a year, the ratoon crops growing, as does cane, more rapidly than the plant. It is stated that an acre will yield in Java from 1,000 to 1,200 pounds of decorticated fibre, worth six cents per pound.

Ramie has no regular season for harvesting, and is cut when it attains its growth, and the stalk near the ground shows a reddish brown tinge. As there is no regular harvest time, the cutting in a field of two hundred acres may be carried on continuously from January to December, the field being cut over three or four times, as the crops mature every three or four months. This enables a gang of hands to be kept at work throughout the year, and at no time is there any extra pressure of work, if the cutting and cleaning are kept well in hand.

Ramie will grow in any part of these islands where the land is kept moist by rain or irrigation. In such districts as Kona and Hilo, or wherever the guava bush thrives, ramie may be relied on. The secret of culture, is to force its growth as rapidly and steadily as possible from the planting to the cutting, without a check in its growth, for in case it receives a check, it will send out branches or lalas, the same as cane does, which injures the quality of the fiber.

Although it will grow here readily, no systematic efforts have been made recently to establish it as an industry, for the simple reason that no machine has been perfected, which will separate the fiber from the bark, owing to the peculiar gumminess which pertains to it, and prevents what is readily

accomplished with other fibers, such as jute, flax, sisel, etc. This decorticating process must be done without the aid of chemicals, which injure the strength and the gloss possessed by the fiber when cleaned by hand. In China it is always cleaned by hand.

Mr. Frank L. Winter informs me that Mr. J. C. White has constructed the model of a machine which promises to clean the ramie fiber and turn it out in the condition required by the factory, or for bleaching by a process for which he holds the agency. As this machine has not been patented, nothing can be ascertained regarding its details, until letters patent have been secured. It is to be hoped it may prove to be the long-sought invention which is now needed to establish an industry so well adapted to these islands. As far as can be ascertained, no country has as yet produced a ramie decorticator which has given satisfaction, or which has received any of the premiums offered for its invention.

Until this question of a cheap and serviceable decorticator has been solved, it is not wise to engage extensively in the cultivation of ramie. But with such a machine, supplied at a moderate cost, a new field will immediately be opened to Hawaiian industry, in which natives as well as foreigners may engage with small capital, and with every prospect of success. And as this plant will grow in every tropical country, there can be no question about its rapid development, or that it will soon become one of the leading industries, in the same way as the invention of the cotton gin developed the cotton industry.

For those who wish to investigate this subject, it may be added that a valuable article on ramie, describing the best mode of cultivation and its value, will be found in the June number of the *PLANTERS' MONTHLY* for this year, and a lengthy report from Prof. Hilgard, may be found in the *Transactions of the Agricultural Experiment Stations of the University of California*, for the year 1890, to which those in search of further information regarding it are referred. These articles are the latest publications about ramie, and on this account valuable for reference.

H. M. WHITNEY,
Chairman Committee on Ramie.