THE

# PLANTERS' MONTHLY,

PUBLISHED FOR THE

## Planters' Labor and Supply Company,

OF THE HAWAIIAN ISLANDS.

VOL. V.] HONOLULU, NOVEMBER, 1886. [NO. 8

## *THE PLANTERS' MONTHLY.*

At its annual meeting, held in this city in October, the Planters' Labor and Supply Company decided to make a change in the editorial and business management of this periodical. In accordance with their action, it will in future be published by the Hawaiian Gazette Company, and edited by the undersigned. Its size will be increased to forty-eight pages monthly, making a volume annually of nearly 600 pages.

This periodical has already earned for itself an honorable place among publications of its class, as is attested by the frequent republication in foreign papers and magazines of articles which originally appeared in it. No higher compliment could be paid to it and to the gentlemen who have been its editors during the first five years of its existence; and the result of their labors is now embodied in volumes which will always be sought for and studied by those who are in search of the most reliable information regarding the successful cultivation of cane, the improved manufacture of sugar, and other kindred industries to which it is devoted.

To continue to maintain the high standard which this magazine has attained, and to make it as instructive and valuable to its patron Society and to its readers as it has heretofore been, is the most that its editor can expect to accomplish; but to gain this end will require the co-operation of those who have contributed so generously the results of their experience in the sugar and other industries in which they are engaged. Communications on all subjects to which it is devoted will always be acceptable, and whenever ready they may be sent to the editor without farther solicitation. Planters sometimes find in letters and foreign publications received by them, valuable information which will bear republication here. All such will be acceptable.

The price of the PLANTERS' MONTHLY will hereafter be FIVE DOLLARS a year, in accordance with a vote of the Society at its annual meeting, this change to commence with the issue for January, 1887, which number will be the first of a new volume. It is the purpose of the publishers to embellish it occasionally with views of our plantations, mills, villages, and other Hawaiian scenery, as often as the patronage which it receives will warrant them in doing. Some of our sugar mills and plantation scenery are surpassed in no other country; and it is with the view of exhibiting the attractions of our islands, as well as enhancing the value of this publication, that an effort in this line will be undertaken.

In conclusion, the publishers do not hesitate to ask every one interested in the prosperity of these favored isles, and in the growth and development of their agricultural and commercial industries, which are still in their infancy, to assist in the circulation of this monthly, by subscribing for himself or by ordering one or more copies of it to be mailed to such correspondents abroad as may be interested in the subjects to which it is devoted. All communications should be addressed to

H. M. WHITNEY,
*Editor Planters' Monthly, Honolulu, H. I.*

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The East Maui Plantation Company of Makawao, East Maui, have given up cane planting, and application has been made to dissolve and surrender their charter. The property was offered at public auction at an upset price of $50,000, but no bid was obtained, and the property was disposed of at this figure by dividing it; the Haiku Sugar Company taking the mill, machinery, buildings, water works and arable land, the East Maui Stock Company the pasture lands at Pihalo, and Messrs. C. Brewer & Company the balance of the property. This was one of the oldest sugar plantations on Maui, and was formerly owned by Dr. R. W. Wood and A. H. Spencer.

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THE special attention of all persons engaged in the manufacture of sugar is directed to the article on "A New Process of Filtering," taken from the *Demerara Argosy*, which promises to greatly assist in the manufacture of sugar, at a stage of the process where many difficulties have always been encountered. If this new treatment of cane juice works well in Demerara, there can be no question as to its being equally valuable here, provided the principal agent used in it—brown coal—is introduced for this purpose. If successful, it will be worth thousands of dollars to every plantation; and, therefore, no time should be lost in making the necessary provision for its successful introduction.

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

MONDAY, October 18, 1886.

FIRST DAY.

The fifth annual meeting of the Planters' Labor and Supply Company was held in the Chamber of Commerce room, Campbell's block, the President, Hon. S. B. Dole, calling the meeting to order at 10 a. m.

Upon a call of the roll by the Secretary, the following shareholders were found present, or with proxies, representing the shares set opposite each name:

| | | | |
|---|---|---|---|
| Alexander & Baldwin | 600 | Kilauea Sugar Company | 500 |
| Alexander, S. T | 5 | Kohala Sugar Company | 600 |
| Atherton, J. B | 5 | Kipahulu Mill, | 50 |
| Baldwin, H. P. | 5 | Kipahulu Plantation | 200 |
| Beecroft Plantation | 100 | Lidgate, W. & Co | 300 |
| Bond, E. C | 5 | Makee Sugar Company | 500 |
| Castle, S. N | 5 | Macfie, R. A. Jr | 5 |
| Dillingham, B. F | 3 | Okala Sugar Company | 300 |
| Dole, S. B | 5 | Princeville Plantation | 500 |
| Eleele Plantation | 500 | Pacific Sugar Mill | 500 |
| Glade, J. C | 5 | Rickard, W. H | 100 |
| Grove Ranch | 250 | Smith, A. H. & Co | 100 |
| Hawaiian Agricultural Co | 1,000 | Smith, W. O | 5 |
| Hitchcock & Co | 400 | Smith, A. H | 5 |
| Halstead, R | 200 | Spalding, Z. S | 500 |
| Honomu Plantation | 150 | Schaefer, F. A | 5 |
| Honokaa Sugar Company | 400 | Spencer, James G | 2 |
| Horner, J. M | 5 | Thurston, L. A | 5 |
| Horner, W. Y | 5 | Wilcox, G. N | 350 |
| Haiku Sugar Company | 1,000 | Wilcox, A. S | 250 |
| Hamakua Mills | 150 | Wailuku Sugar Company | 1,000 |
| Isenberg, P | 1,000 | Waiakea Mill Company | 200 |
| Jones, P. C | 5 | Walker, T. R | 5 |
| Kaneohe Plantation | 125 | Welch, And | 5 |

The Secretary's report for the year was then presented and read by Hon. L. A. Thurston.

The portion referring to the Treaty gave rise to discussion at some length, taken part in by Messrs. Spalding, Schaefer, J. Austin, A. H. Smith, Macfie, Walker, J. M. Horner and Major Bendel.

It was finally recommended that the report be printed in the PLANTERS' MONTHLY, omitting that portion referring to the Treaty, and substituting therefor a statement of the present status.

AFTERNOON.

Mr. P. C. Jones, the Treasurer, presented his report for the past year, as follows:

PLANTERS' LABOR AND SUPPLY COMPANY IN ACCOUNT WITH P. C. JONES, TREASURER.

| | | |
|---|---|---|
| Paid Secretary Thurston's order, No. 109 | $ 300 00 | |
| Paid Secretary Thurston's order, No. 110 | 90 00 | |
| Paid Secretary Thurston's order, No. 111 | 155 25 | |
| Paid Secretary Thurston's order, No. 112 | 500 00 | |
| Paid Secretary Thurston's order, No. 113, for $215, less $6 | 209 00 | |
| Secretary Thurston, on account of his salary, as per receipt | 300 00 | |
| | | $1,554 25 |
| Sundry expenses for Publications, etc., as per Vouchers | | 2,125 50 |
| | | $3,679 75 |
| Balance cash on hand to new account | | 732.05 |
| | | $4,411 80 |

COLLECTIONS.

| | | |
|---|---|---|
| Balance from old account by cash on hand October, 1885 | | $ 924 30 |
| Amount assessments paid in corporation—cash book on pp. 19, 20 and 21. | $3,612 50 | |
| Less PLANTER over refund | 125 00 | |
| Actual Assessments collected | | $3,487 50 |
| | | $4,411 80 |
| Balance cash on hand to new account | | $732 05 |

There are sums outstanding due Secretary, printing PLANTERS' MONTHLY, rents, etc., amounting to $700 or $800, which should be paid at once.

E. & O. E. P. C. JONES, Treasurer.

Honolulu, October 18, 1886.

Mr. Jones said that he wished to make a statement in connection with the Treasurer's report. The *Advertiser* had charged this Company with spending large sums of money in Hawaiian politics. He now wished to say that during his incumbency as Treasurer, for three years, not one dollar of the funds of the Company had been spent on Hawaiian politics. So far as he was concerned personally, he had subscribed money to defeat Mr. Gibson, and would do so again, but none of the Company's money had been used for that purpose.

Mr. Spalding considered that, after the tortuous course of the *Advertiser* the last few weeks, it would be hardly fair to pay any attention to its utterances, or to hold that paper responsible for anything.

The President announced the election of Trustees as the next regular business.

Mr. Spalding thought it would be a good time to discuss the standing of the Company. He did not think there was much to do except to keep the organization intact. They would not need many meetings this year from the present outlook. After settling the future status of the Company, then elect the officers. It might be as well to take up the monthly magazine first, as the action taken on that would largely decide other matters.

Mr. John M. Horner moved the following resolution: "Resolved that a committee of three be appointed by the President, whose duty it shall be to revise or so change our constitution or by-laws that our members may be more equally and justly assessed, and their rights as planters be as well, or better, maintained, and to report the same to this Association at our next yearly gathering for adoption or rejection."

Mr. H. P. Baldwin thought it would be better to report to-morrow morn-

ing instead of next year. They wanted to get on a better basis at once, and not to wait for another year. The assessments were rather one-sided; too few had to bear the burdens. He would move as an amendment, that the committee report to-morrow morning, and that it consist of five members instead of three.

Mr. Horner accepted the amendment.

Mr. Spalding did not think they could change the matter of stock, which was fixed by their charter; but they could change their by-laws as to directors, etc. He was in favor of the committee reporting to-morrow morning, because it did not require a great length of time to decide what articles of the by-laws should be changed. When it came to assessments it would not be practicable to change the stock. They might agree on smaller assessments. He was in favor of continuing assessments on the basis of tonnage, and was willing to pay according to his tonnage; but there were certain things from which they did not receive benefits according to their tonnage. The PLANTERS' MONTHLY was the only immediate benefit he got for his $250 a year. Others got the same benefit for $125, and that was hardly fair. There were other indirect benefits which all participated in. It further struck him that the amount of work to be done by the Trustees in the future would be very limited as compared with the past. He wanted to have some things taken up and discussed which were not actually the business for which the Company was chartered. One matter was that of the Minister at Washington. He did not think that the members appreciated that they had a Minister at Washington who was doing very much for the Company for very little return. He would rather see a certain amount of money given to that gentleman, than for almost any other purpose that he knew of. He did not wish to see the PLANTERS' MONTHLY given up so long as it gave matters of interest to planters. They had always been leaving a great many things to the Trustees, to which the latter had perhaps not given the same consideration as the Company would. Let all these things be considered and then elect the officers.

Mr. Horner said it seemed their organization was intended to be for the management of large amounts of property which they did not have. They were tied down to certain things. It would be better for them to be more of an agricultural club, and give up their charter.

Mr. Walker and Mr. Baldwin opposed giving up the charter.

Mr. P. C. Jones thought they might not get their charter renewed now, if it was given up, on any terms. The question of dissolution had originated with him more from discouragement at results than anything else. We should do what we could to bring in all the planters into the Company; and he hoped some of those who had gone out would come back.

Mr. Spalding said some of those who left were disposed to come back. Even Mr. Spreckels thought he may have made a mistake in going out. There had been hard feelings between the Company and Mr. Spreckels

and the *Advertiser*, but there was no need for such to have been the case.

Mr. A. H. Smith said some members thought too much money was being spent on matters outside of the country, and that it would be better to have a farmers' club for the discussion of agricultural matters. If all the stockholders paid their assessments there would not be a shortage.

Mr. Horner's motion was then put and carried, and the President appointed the following Committee:

Messrs J. M. Horner, H. P. Baldwin, Z. S. Spalding, R. Halstead and P. C. Jones.

Mr. Spalding moved the matter of the PLANTERS' MONTHLY be taken up for the benefit of the Committee. Carried.

Mr. L. A. Thurston said that the MONTHLY was published on the following terms: The *Gazette* Company printed it for $30 a month, for which each member of the Company was supplied with a copy and such exchanges as were needed were supplied. This took about 150 copies. There were also about 75 copies sold to outsiders, the receipts of which had gone to the *Gazette* Company. The Trustees had on several occasions endeavored to get the *Gazette* Company to assume the entire responsibility of the publication, and to charge each subscriber, but they had refused on the ground that there was no money in it, they preferring to take a fixed sum from the Company rather than have the collecting of individual subscriptions. The present cost including salary of secretary and editor was $1,600.

Mr. Spalding said he was well satisfied with the manner in which the Magazine had been conducted. He had run a hotel and a newspaper, and knew how difficult both were to manage. This Magazine should always contain something of interest to all planters. If they could have it conducted well next year it would be worth all that it cost even if the Company did nothing else. The MONTHLY had taken up a great deal of the time of the secretary. He would like to see a pamphlet twice the size of the present one and to contain twice as much as the present one. He had seen the *Gazette* Company and they were now willing to publish 300 copies just twice as large as the present edition for $600 a year, and they would take the whole thing in hand, including editing and collating for $1,200. He desired to know whether the Secretary could still continue to devote his time to the editing as he had done.

Mr. Jones asked if there would be any difficulty in getting up double the quantity of matter?

Colonel Spalding said that many of the planters had not done as much as they should in supplying information. If they did, he thought there would be no difficulty. If they would send forward reliable information relative to any experiments they made, it would be of great value.

Mr. Thurston said that he had not undertaken the editing of the MONTHLY for the pecuniary profit. If arrangements could be made for getting the work done elsewhere, he would be perfectly satisfied. If they could

get a 48-page pamphlet for $1,200 instead of 24 pages for $1,600 it would of course be for their advantage to do so.

Mr. Macfie was in favor of giving it over to the *Gazette* Company to do the editing, if Mr. Thurston did not care about it. He suggested that the secretaryship be also given over.

Colonel Spalding said that according to the by-laws the secretary must be one of the trustees.

Mr. Macfie said that the by-laws could be altered.

Colonel Spalding moved, "That the Board of Trustees be authorized and instructed to contract with the *Gazette* Publishing Company for the editing and publishing of the PLANTERS' MONTHLY double its present size, for the next twelve months, for the sum of $100 per month, 300 copies to be delivered to the Company; and that the Company be responsible for the $1,200, making up any deficiency by assessment among the stockholders." Agreed to.

SECOND DAY.

The meeting was called to order at 10:15 by Vice-President H. P. Baldwin.

Mr. J. M. Horner reported from the committee of five appointed yesterday, recommending that Article 11 of the By-Laws be changed to read as follows:

"The Board of Trustees may levy assessments on the capital stock of the Company, as provided in Article 8, and may fix the date (not less than thirty days from the time of passing the resolution) at which said assessment, if unpaid, shall have become delinquent, and any stock upon which any assessment may become delinquent shall be advertised by the Secretary in some one newspaper, published in Honolulu, for the period of thirty days, and if the assessments still remain unpaid, the Board of Trustees shall declare the same forfeited to the corporation, and the holder shall be debarred from any rights or privileges based upon the possession of such shares of stock [provided that any member may at any time surrender any part of his stock to the Treasurer of the Company upon his payment of all assessments that may have become due and payable on such stock so surrendered up to the time of such surrender]. And the Board of Trustees may then issue new certificates of stock in place of shares so forfeited [or surrendered], the same as if the forfeited [or surrendered] shares had never been issued."

The words in brackets constitute the amendments added.

Mr. Horner said the object of the Committee had been to allow those who have more shares than they thought they ought to pay assessments for to surrender, so as to bring them more on an equality.

The Committee further recommended the passage of the following resolution:

*Resolved*, That this meeting do recommend and urge upon all persons interested in the sugar business in these islands to join this Association, and help to carry out more vigorously the objects of this Company, and subscribe for shares of the capital stock, in proportion to the average tonnage of the production. Passed.

Mr. Spalding moved a change of Article 6, making the number of Trustees seven, instead of thirteen. Advocated by Messrs. Spalding, Jones and Austin; opposed by Messrs. Macfie, Bishop and J. M. Horner.

Upon a vote the motion was lost by a vote of 5,255 shares in favor of and 3,075 votes against the amendment—the necessary two-thirds majority not being obtained.

AFTERNOON.

Mr. Jones said that the motion to reduce the number of Trustees to seven had been voted down, and that he would move nine as a compromise. Carried.

Mr. Horner moved as an amendment that four constitute a quorum instead of five, as at present. Carried.

Mr. H. P. Baldwin and E. C. Bond presented the reports on fertilizers and seed cane, which were accepted and ordered printed.

The election of Trustees came next in order; a ballot was taken, and the Secretary and Treasurer were appointed tellers.

Whilst the result of the voting was being ascertained, a discussion was engaged in relative to fertilizers.

Mr. A. H. Smith, representing the Committee on Varieties of Cane, being called on for the report, said the report for the year had been looked over, and there was nothing to add, as nothing further had been discovered.

The Secretary then declared the result of the election as follows: H. P. Baldwin, 11,790; H. F. Glade, 11,780; J. Lidgate, 11,435; George C. Williams, 11,430; R. Halstead, 11,425; P. C. Jones, 11,085; George N. Wilcox, 9,570; James B. Castle, 9,210, Z. S. Spalding, 6,950.

Mr. P. C. Jones, representing the Reciprocity Committee, said the Committee had not been called together, nor had he written out any report. He spoke of Mr. Carter as being a hard and faithful worker on behalf of the Treaty at Washington. He had the confidence of the Senators there, and great credit was due to him.

Mr. R. A. Macfie, Jr., representing the Transportation Committee, presented his report, and also a statement in connection therewith from J. M. Horner, concerning transportation on the Kukaiau Plantation.

The Secretary read the report of the Committee on Manufacture of Sugar, written by J. M. Lydgate, he being absent.

The meeting adjourned until the next day at 10 o'clock.

THIRD DAY.

The members assembled shortly after 10 a. m., President H. P. Baldwin in the chair.

After the minutes of last meeting were read and approved, Mr. Thurston, Secretary, completed the reading of the report from the Committee on Manufacture of Sugar. A discussion ensued, mainly on the

methods of boiling sugar, in making one and two grades to make fourth sugar.

Mr. Jones said the Hawaiian Agricultural Company had tried boiling for one grade during a year, and found that it lowered polarization without compensation in quantity.

Mr. H. F. Glade reported on a trial in boiling for one grade, the result of which was an average of 91 per cent., when before and since there was an average of 94 and 95 per cent. They had therefore come to the conclusion that one grade boiling was not advantageous.

Mr. H. P. Baldwin had tried one grade boiling, the average of polarization being favorable, but the process more expensive for fuel. He had therefore given it up.

Others spoke on the subject, without varying much from the above conclusions.

The Secretary read the report of the Committee on Fruit Culture, which had been handed to him by Mr. Lycan. The report was accepted and ordered to be printed.

Mr. Thurston stated that the silver-leaved wattle, a species of acacia, had been found to do better than anything else, as a timber tree, on Maui, growing faster than the eucalyptus. It made excellent fence posts, and was considered the most valuable timber tree that had been tried.

Mr. T. R. Walker said he wished that any member who could would visit the Government tree plantation on the hill back of Honolulu.

Mr. J. M. Horner, from the Committee on Legislation, read a report on that subject.

Considerable desultory discussion followed upon the reading of this paper, which certainly created a sensation, and the sentiments of the Convention were embodied in the following resolution, unanimously passed:

*Resolved*, That the Planters' Labor and Supply Company do hereby place themselves on record as being opposed to an opium license, which they consider injurious to the planting interests of the country, and regret that a law permitting it was passed. And that we consider the increase of taxes made by the late Legislature to be unjustifiable and in derogation of the interests of planters. Also, that we consider that the vetoing of the law compelling the retaining of road taxes in the districts was against the interests of tax-payers and of good roads, and we are of opinion that such a law should have been passed.

The Treasurer reported that at a meeting of Trustees, Mr. H. P. Baldwin had been appointed President; Mr. H. F. Glade, Vice-President, and Mr. P. C. Jones, Treasurer. The Secretary had not been elected, but Col. Spalding had acted in that capacity pro tem.

COMMITTEES.

The following are the Committees for the year:

LABOR.—Z. S. Spalding, W. F. Allen, J. K. Smith, R. R. Hind, S. L. Austin.

CULTIVATION.—G. C. Williams, C. Koelling, W. S. Rickard, G. N. Wilcox.

MACHINERY.—J. M. Lidgate, R. Halstead, T. H. Davies, E. Lycan, J. Ross.

LEGISLATION.—S. B. Dole, J. B. Atherton, T. R. Walker, W. R. Castle, D. H. Hitchcock.

RECIPROCITY.—F. A. Schaefer, W. W. Hall, C. R. Bishop, R. Halstead.

TRANSPORTATION.—J. M. Horner, W. Y. Horner, J. N. Wright, Chas. Notley, G. H. Dole.

MANUFACTURE OF SUGAR.—E. M. Walsh, Jos. Marsden, C. C. Kennedy, A. Haneberg, A. Dreier.

LIVE STOCK.—B. F. Dillingham, W. H. Bailey, G. N. Wilcox, A. Dreier, A. H. Smith.

FORESTRY.—T. R. Walker, E. Lycan, E. G. Hitchcock, C. R. Bishop, W. H. Purvis.

FERTILIZERS AND SEED CANE.—R. A. Macfie, A. H. Smith, E. H. Bailey, R. Halstead, A. Faye.

VARIETIES OF CANE.—H. M. Whitney, G. C. Williams, W. H. Purvis, G. F. Holmes, J. Ross.

STATISTICS.—W. W. Hall, W. F. Allen, C. S. Kinnersley, H. W. Mist, C. M. Cooke.

FRUIT CULTURE—L. A. Thurston, Jonathan Austin, C. Koelling, G. N. Wilcox, E. H. Bailey.

This completed the business and the meeting adjourned at noon.

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## SECRETARY'S ANNUAL REPORT.

*To the President and Stockholders of the Planters' Labor and Supply Company*—GENTLEMEN: The following is respectfully submitted as the Secretary's report for the past year:

### TRUSTEES AND OFFICERS.

At its last annual meeting, held October 10, 1885, the Company elected the following-named gentlemen as Trustees: S. B. Dole, H. P. Baldwin, W. E. Rowell, G. N. Wilcox, R. Halstead, H. F. Glade, R. A. Macfie, J. B. Atherton, P. C. Jones, L. A. Thurston, W. Y. Horner, J. M. Horner and W. R. Castle.

The following officers were elected by the Trustees: President, S. B. Dole; Vice President, H. P. Baldwin; Treasurer, P. C. Jones; Secretary, L. A. Thurston; Auditor, J. B. Atherton.

The Trustees have held five meetings during the year.

### IMMIGRATION AND LABOR.

During the year ending October 1885, immigrant laborers were brought into the country to the number of 1,734, consisting of Portuguese, 63;

Japanese, 1,598; and South Sea Islanders, 73. This was in addition to women and children.

The following is a statement of arrivals of immigrants since the last annual meeting.

March 2, 1886—By Sterlingshire—Portuguese—Men, 148; women, 99; children, 192. Total 439.

Feb. 4, 1886—By City of Pekin—Japanese—Men, 690; women, 228. Total 918.

Sept. 1886—By Amana—Portuguese—Men, 146; women, 116; children, 239. Total 501.

Total Portuguese men 294, women 215, children 431.

Total Japanese men, 690; total new laborers for the year, 984; total new laborers for two years last past, 2718.

No South Sea Island immigrants have been obtained during the year, the last attempt of the Hazard, two years ago, having met with such poor success. The brig Allie Rowe is now on a trip to the South with orders for 200. The South Sea Islanders are obtained at lower wages than either Japanese or Portuguese, but it is doubtful policy to obtain them as almost without exception they return home upon the expiration of their contracts, the expense of getting them here thereby becoming a dead loss. As none of the Japanese contracts have yet expired, we can not say what they will do, but it is probable that a large proportion of them will remain in the country. The Portuguese have shown that in the main, they will make a permanent population, but a small proportion of the whole number brought here having gone to California, and the reports from those who have gone there are that they regret the change, and would be glad to get back.

There is no doubt that the expense of obtaining Japanese at $55 each, and Portuguese at $100 each, is very much more than is necessary. Those figures have given the introducers of the laborers a much wider margin of profit than the planters can afford to pay, and there is no reason why the figure should not be very much reduced in the future.

The obtaining of laborers during the coming year is a question of the greatest importance. The position of the Government with relation to the subject is doubtful. Sometime ago it was announced that the Government would not undertake to introduce any more laborers for the present. Since that a partial change of administration has taken place and an item of $150,000 for immigration purposes has been placed in the loan bill. It is however optional with the Government to borrow the money and expend it for this purpose, and no further declaration of policy has been made since that above mentioned.

Meanwhile the available plantation laborers already here are growing less in number by reason of departure, and engaging in other occupations, and the necessity for a new supply will soon become urgent.

There are now applications on file for about 700 Japanese, and a much

larger number will soon be required. In several of the districts labor is abundant, at the present rate of wages, but any decrease in wages would immediately cause a scarcity of labor. With the present prices of sugar cheap labor is an absolute essential to the future existence of the sugar industry. It is not a question of sentiment or advisability of high or low grade labor, it is simply a cold question of fact—will you continue the sugar industry, with cheap labor, or, will you abolish the sugar industry of the Islands. That is the only alternative.

### THE PLANTERS' MONTHLY.

THE PLANTERS' MONTHLY has been published each month during the year. The *Sugar Cane*, *Sugar Bowl*, *Farm Journal*, *The Louisiana Experiment Station Bulletin*, *San Francisco Merchant*, *Barbadoes Planters' Gazette*, *Queensland Planter and Farmer*, *Mackay Standard*, *Mauritius Planters' Gazette*, and the *Tropical Agriculturist* of Ceylon are among its exchanges, and the endeavor has been to discuss not only local affairs and interests, but to collate from all available sources such information as may be useful to the planting and stock business of this country. Communications from the practical men of the country have been frequent, and form one of the most valuable features of the publication. The editor most heartily thanks those who have assisted with pen and suggestion, without which the labor of editing would have been greatly increased, and the results much less satisfactory.

### THE FUTURE EXISTENCE OF THE COMPANY.

At a meeting of the Trustees held in August last, the following resolution was adopted:

"WHEREAS the immediate objects for which the Planters' Labor and Supply Company was organized, to wit, the procuring of labor, the exchange of views and experience regarding cane cultivation and the manufacture of sugar have been largely accomplished, and the present needs of the planters are largely met by the publication of the PLANTERS' MONTHLY, and the expense of continuing the association is considerable and may not be justifiable, therefore

*Be it Resolved* that the Trustees of the P. L. and S. Co. recommend to the Company at its next annual meeting consideration of the question of the dissolution of the Corporation, and that they do further recommend that the publication of the PLANTERS' MONTHLY be continued."

This resolution is therefore before this meeting for consideration.

Notice has been given in the PLANTERS' MONTHLY of the question, and it has elicited a number of expressions of opinion, so that it is unnecessary to make further mention of it here.

## *REPORT ON FERTILIZERS AND SEED CANE.*

To the Planters' Labor and Supply Company:—Seed cane, the best kind of seed, and the best method and time of planting, etc., etc., is a subject that has been pretty thoroughly ventilated in the meetings of this society.

I can hardly hope to present any change of ideas in regard to this subject, or enlarge on the able reports made in the past by my predecessors on this committee.

Changes and improvements have been made in sugar machinery—changes have been made in the method of manipulating and manufacturing sugar, but the best kind of seed to be used, and the manner of planting the same, is a subject that does not materially change; nevertheless, planters differ in their views on this subject. This difference of opinion is due partly to the fact that there really is some difference in the way seed cane acts in different parts of the Islands, owing to a difference of altitude and the climate of our plantations.

Then again some planters start with a theory in regard to seed cane and don't yield their theory, although facts and experience may go against it—or else they don't study into practical results sufficiently to see whether their theory is sustained or not.

One of the most important points on which planters have differed, and which has been lately discussed, is whether plant cane or rattoons should be used for seed. A great many hold that we should always use the largest and finest looking plant cane for seed, in order to keep up the quality of our cane, and prevent deterioration.

Now all will agree that we should use the best of seed, but planters seem to differ as to what are the essential features that constitute good seed. I can only give the result of my own observation in this matter.

My experience is that the most essential feature in good seed, is a large healthy eye, that will germinate and grow quickly—next in importance I would place a good large healthy stalk. When we have both combined in one seed, a fine eye and large healthy stalks, the seed is perfect. But I usually found that the eyes of large, rank growing plant cane don't germinate as readily as cane that has been somewhat stunted in its growth, or has grown slowly. The reason seems to be this: Very rapid growing cane spends all its strength in the eye, and has no tendency to grow at the side—consequently the buds or eyes are apt to be poorly developed and flat, whereas the buds in cane that has grown more slowly, and is somewhat short jointed, are generally large, more fully developed and sprout readily when planted.

For the above reason, the planters in our district have found that good healthy rattoons, which don't usually grow as rank as plant cane, have when irrigated and cultivated, made as a rule, the best seed.

I don't mean to say that fine plant cane will *never* make good seed, but that we should not select that kind of cane for seed, simply because it is large and fine looking.

You may find the essential features of healthy bud and stalk combined best in plant cane, or you may find them combined best in rattoons, as the case may be.

It is quite probable that in some districts where the cane is not irrigated, and a large rank growth is not obtained, that plant cane may make the best seed that can be used.

I simply give it as my experience that rattoons generally speaking have buds that germinate the best, and that as a rule, I prefer good, healthy ratoons for seed. We all know how important it is that a cane field has a good, fresh and even start. A cane field with such a start, has a great advantage over a field that has to be replanted once or twice.

It is always more necessary to be careful in the selection of healthy seed —seed that has no sign of blight—when poor land is to be planted or land which has been exhausted by frequent planting.

I have often known good virgin soil to be planted with comparatively unhealthy seed—seed that was covered with blight and small insects, and yet the field turn out as heavy cane as the ground could hold. Where the soil is good and the cane well cared for, it seems to impart a vigor to the young cane and create a growth that overcomes and outgrows all tendency to blight and disease.

We all prefer the tops either of plant cane or rattoons, for seed—but plantations infested with borers should be very cautious about using this seed. Where borer exists in the cane, it is full grown in the body of the cane, and can be easily detected and thrown out of the seed—but in the top we find the egg laid by the borer beetle, or the minute borer just beginning its course—both too small to be discovered without very careful observation, certainly too small for the workmen to see as they handle the seed. Hence the borrer is more likely to be propagated by planting the tops of cane, than by planting the body of the cane.

Seed cane will start better for being soaked two or three days in water. But where from 500 to 1,000 acres are to be planted per annum, this is impracticable, as it entails a great deal of work and trouble. Seed for replanting a field however, can be soaked in water, or wet down every day for three days, as it lies in a pile, well covered with trash, to great advantage. The replant will then start quickly and vigorously.

FERTILIZERS

No new facts of special importance have come to my knowledge of late. The various kinds of fertilizers offered by the enterprising manufacturers of fertilizers have been tried throughout the Islands with good and indifferent results. The imported fertilizers have produced better results on some parts of Hawaii and Kauai than they have on Maui.. The fact is

we have been working very much in the dark, in not having our soils analyzed. Having ascertained the elements that the soil is lacking in, we can select a fertilizer with more intelligence. Bone meal, a fertilizer that produces such good results on Kauai, has no effect, so far as I can ascertain on Maui—certainly it has none in our district. In fact I have tried faithfully all the fertilizers that have been imported, and none of them seem to effect the growth of our cane. We are this year trying sand and lime on parts of our fields, where we judge from the appearane of the soil that these articles will be of benefit. We have spread sand over the land at the rate of about thirty ox cart loads to the acre. The cane has just been planted, and it is too soon to predict anything in regard to the result.

There is a point that I would like to present for your reconsideration, and I think we cannot lay too much stress on it. Every planter has on his own place, enough of material, if properly hoarded and cared for, to fertilize and renovate his land, to a great extent, to say the least. On each plantation, a large place should be hollowed out in the ground, and covered with a shed roof. I think it would be well to cement the bottom of the hollow. Under this shed roof, thus prepared, all the carcasses of animals that die on the place, filter press refuse, in fact everything that will enrich the mass, should be dumped. Let this mass be wet down once in a while to hasten the process of decomposition.

I would suggest that this shed might be constructed at the base of a hill, and so arranged that a cart could drive onto the roof and drop its contents through a scuttle in the roof. Thus we can manufacture on our plantations, a fertilizer that will be sufficient for all the land planted each year, and at comparatively little expense.

The agent of a fertilizer manufacturing company, once told me that the carcass of a bullock was worth to them $30. They take this carcass and it forms the base of a fertilizer—in other words is mixed with inferior fertilizing materials—and this is the bonemeal, superphosphate, etc., that we buy. Now these fertilizers are good and excellent, but it seems a little ridiculous that we should throw away on our plantations the very material that forms the cream of the fertilizers we buy and are constantly importing from abroad.

If the carcass of a bullock is worth $30 to a manufacturer of fertilizers, it is certainly worth somewhere near that amount to us. A few planters have already started this plan of making a compost heap for fertilizing. There is nothing new in this, it is adopted in other countries, where farming is carried on scientifically, and the farmer aims at returning to the soil, from year to year, the elements that their crops have drawn from it.

In cases where it is found that there is a marked lack in the soil of some particular element, that is necessary to a healthy growth of cane, the fertilizer that would best supply this lack, might be imported from abroad, and added to the compost mass obtained on the plantation.

In submitting this report, I would say that I have not had the opportu-

nity of consulting with the other members of the committee, or of obtaining their views. I have therefore, used the pronoun I in writing the above, as I don't wish to make them responsible for opinions they may not coincide with. Respectfully submitted.

H. P. BALDWIN, Chairman.

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The following letter was also read:

MR. H. P. BALDWIN, *Chairman of Committee and Seed Cane, Planters' Labor and Supply Co.*:

DEAR SIR:—I cannot hope to contribute anything on this subject, that has not already been said in a better way by others, and will not attempt to do more than relate briefly my own experience and opinions derived therefrom.

For seed, I have always been in favor of using the best of plant cane; And by this I do not mean long jointed soft cane such as makes the planter's eyes sparkle to see going to the mill; for not only would it be a waste of valuable material to plant such seed even if the buds were strong, but the buds of such cane, of rank growth, are apt to be weak. I mean good stocky cane with joints of medium length—2 to 4 inches—and strong healthy buds.

Practically I have used various kinds of seed, and can scarcely avoid the conclusion that it makes but little difference what *kind* the seed is, provided the *quality* is good. I never used 2d or 3d rattoons, or would I recommend to anyone the use of hard, inferior cane that is "all joint."

I was once compelled to use some old plant cane that had "tasselled" the previous year, (2 years old). It was buried in grass, rat eaten and much of it rotten, but I used every joint that had a healthy bud. Following right next to it, in the same field (all the same planting), came some young ratoons, such as would cut only one to three seeds to the stalk. The weather was favorable, the seed all started promptly, and I would have defied any one, at any time, to go through the length of that field (55 acres) and tell where the one kind of seed ended and the other began. Branches that have attained suitable size make good seed, but although they are thought by some to be the "natural seed" of cane, I fail to find that they produce any better cane than ordinary cuttings, nor see any reason why they should.

As to whether the upper or lower half of a cane is the better for seed, I should not hesitate to take the upper portion, where are to be found the larger buds that have not become hardened, particularly if it were late in the year, when the cane is in such a state of preparation for, or in process of blossoming. I'd sooner take my chances of a good crop from the upper than from the lower end of the stalk. At the same time, I have some doubt whether, in the end, there would be much difference between the two, although the former would make an earlier and better start,

Of fertilizers, I have tried bone meal, superphosphate, guano and sheep manure. Where the soil was good, there was not the slightest difference between cane fertilized and not fertilized. Only in one small spot, where the soil was poor and *shallow* was there any marked effect, and this was chiefly in the color of the leaf, being more green than the non-fertilized, from about the 3d month to near the maturity of the cane, the superphosphate showing the deepest green. There was also a slight, but clearly marked difference in the height of the cane, when three to perhaps twelve months old, this slight difference—it may have been six inches—being clearly perceptible from the cane having been planted in sections, intervening nonfertilized sections.

The fall in height of non-fertilized sections was clearly defined.

Kohala, Sept 15, 1886. Yours Truly, E. C. BOND.

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## *REPORT OF TRANSPORTATION COMMITTEE.*

*To the President and Shareholders Planters' L. & S. Co.*

GENTLEMEN :—The fact that the members of your committee on Transportation are so scattered on different parts of the group as to entirely prevent the possibility of their meeting together to take any joint action, renders them unable to lay any satisfactory report before you. So far however, as can be ascertained no new methods of Transportation seem to have been tried during the past year. Practice and experience, however, appear to have rendered the old plans more efficient than formerly, and comparatively little is now heard of the difficulty of supplying mills with cane, such as used to be the case but a few years ago. Where flumes are not possible, railways seem to be most favored, and extension of lines and increase of rolling stock have enabled planters to take off the recent heavy crop with less difficulty than could have been anticipated.

Where railways and flumes are both impraticable, ox, mule, or horse teams continue to be generally employed, and the annexed communication from Mr. John Horner shows that economical work can be accomplished by these means where experience and intelligence have reduced the practice to a good system. Some difficulty is occasionally experienced from the danger of fire caused by sparks from the locomotives used on railways. Spark arrestors burn out quickly, and when in good order interfere seriously with the draft. A locomotive that can work without steam, or with steam and complete absence of sparks, is therefore a desideratum. The adoption of petroleum as fuel has been spoken of but has not as yet been actually applied on locomotives in this country. Let us hope that the ingenuity of some of the many able engineers in the land

may soon provide us with what is required. Respectfully submitted by

R. MACFIE, JR.,
Chairman Committee on Transportation.

Honolulu, October 19th, 1886.

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*Mr. Chairman Transportation Committee*:

DEAR SIR:—Having been appointed one of your committee on cane transportation, it is but natural that you should expect some contribution from me towards your report. I know of no new features developed in transportation since the last Planters' meeting, without it may be the perfecting of details in present modes, and as none perhaps has been less ventilated than the plan of transportation pursued by Kukaiau Plantation, I may do service as one of your committee by giving the *modus operandi* of transportation practiced upon that plantation.

Kukaiau is comparatively a new plantation, two crops only having yet been harvested, one of 945 tons, and one of 1,430 tons.

Kukaiau is situated in Hamakua, Hawaii, consequently in a rainy region, and the past two years has been exceptionally wet. Yet we took off the two crops quite successfully with wagons. We were six weeks longer taking off the last crop than we should have been but for some breakage in the mill machinery and a weak spot in one of the boilers, which took time to remedy.

But the mill, although of 15-ton nominal capacity, seldom had to wait for cane.

The cost of delivering the cane to the cane-carrier, per ton of sugar, was for the last crop $6.30, and a trifle less for the first crop. This estimate includes cutting, loading, hauling, roadmaking, $1 per day for each wagon and each horse employed, wear and tear of tools, expense of breakages, and the pro rata of plantation superintendence. The cost no doubt will be greater as we get further from the mill. So far the average distance has been less than one mile. We use four good horses or mules to each wagon, which are of a nominal capacity of four tons of cane each, and we have no difficulty in transporting that amount at one load when the roads are in condition. We drive the load by the side of the carrier, and while the load is being thrown off, the team is hitched to an empty wagon and goes for another load. The mill hands unload direct upon the cane-carrier as fast as the mill is able to take it.

We have 12 wagons, but thus far have used only 10 at any one time. The average number of teams in use daily has been six; that is, this arrangement has worked so well that we have supplied a 15-ton mill with six teams of four animals each. We aim to keep two or more loaded wagons standing by the side of the cane-carriers all the time. I believe Hamakua plantation has already determined to lay aside its horizontal railroads and gravitation tramways, and adopt this way of taking their

cane to the mill. The average expense of getting their cane to the mill now is near five dollars per ton of sugar greater than Kukaiau and the superintendent thinks that five dollars per ton is worth striving for, as it amounts to quite a sum when the yearly output is near three thousand tons. Yours truly, JOHN M. HORNER.

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## *REPORT ON FRUIT CULTURE.*

*President and Members of the Planters' Labor and Supply Company.*

GENTLEMEN:—In making a report on "Fruit Culture" such as it should be, requires more time and greater knowledge than is at the command of one member at least, of the committee on this subject. It would not only be interesting but valuable to almost every inhabitant of this most peculiarly favored country to know the varieties, with descriptions and food values of indigeneous fruit and nut-bearing trees, vines and shrubs. The date of introduction and by whom imported, the many foreign fruit and nut-bearing plants that we find scattered over the Kingdom. The soil and elevation best adapted to the different varieties that we have; and suggestions as to the varieties with descriptions and directions in regard to the best way of procuring the same of all tropical fruit and nut-bearing trees, vines or shrubs. The value in dollars of fruits canned, dried and fresh, and nuts, that are imported, is a vast sum of money that should be kept in the country. As instead of importing (with the exceptions of a very few varieties) we should export extensively and in great variety.

There is probably no one locality in the Islands just suited to all of the tropical fruits, but certain varieties will grow to perfection in almost every piece of ground in the country. While I have the utmost faith in our ability to grow all of the tropical fruits and many of the semi-tropical varieties, I am not ignorant of the fact that there are many enemies to the easy growing of trees and vines. Among these hindrances I will only mention a few:

The white and black aphis is common everywhere; at least three kinds of scale trouble some varieties of fruit trees here, and the wind in many localities is a very difficult factor to deal with, although not insurmountable. But the greatest trouble of all is in obtaining land in fee simple or on a fifty years lease, as no one will plant trees or vines on land that is only his for a few years. And then the freight charges from any of the Islands except Oahu, to Honolulu, are about the same as from Honolulu to San Francisco, so that taking the two freights into consideration at the present time, raising fruit for any purpose except home consumption outside of Oahu would not be advisable; but enough should be grown for all domestic wants. I do not believe that it is the correct policy for the

government and private persons to persist in planting such trees as the Pride of India, Algeroba and Monkey Pod, Palms, etc., where fruit or nut-bearing trees would answer every purpose for which the former are now planted. I believe that if some one of our many holidays was set apart—like Arbor Day in the United States—for the purpose of every one taking part in the pleasures of the day, setting out or planting just one fruit or nut tree, that the Kingdom would receive greater benefit than in any manner such days are now passed, or wasted I might say. In Spain the people have a custom of planting the seed of all fruits eaten while on the road by the side of all public thorough-fares, so that in traveling over the roads you are passing through an orchard of assorted fruit trees all the time. It is generally admitted that the more trees the more rain, and as a natural result better crops. So that I know of no one who should have a deeper interest in tree-planting—and preferably fruit trees—than the sugar planters, and therefore I think that each one should use his individual effort to have the following propositions brought into practice in this country:

1st. All Government or Crown land should either be sold outright or leased for at least fifty years at a nominal rental in tracts not exceeding fifty acres to any one person.

2d. Exempt from taxation ten or more acres, for five or more years, for every acre planted and cultivated in a proper manner in fruit or nut-bearing trees.

3d. A commissioner should be appointed and paid by the government who is thoroughly conversant with fruit culture in all of its branches, as well as wine making, etc., who shall give all information on this subject in his knowledge free of charge to those seeking his advice, and he shall devise means for the destruction of the insects and other enemies of fruit culture, and who shall inspect all trees, vines and plants imported, and see that no new disease is brought into the country.

4th. Encourage the planting of fruit trees, grape vines, and nut and olive trees, by example and advice and assistance, in procuring the trees, etc., where in our power.

5th. Use our influence to have a law passed against adulterated wines, brandies, etc., and in favor of pure wines and liquors made here and from Island grown fruit.

There are many varieties of fruits that will do well in this country, aside from the following list, but from personal observations I can confidently recommend these as being very easy to grow and quite free from the ravages of fruit pests: mangoes, avacado pears, red guava, water lemons, spanish cherries, pine apples, olives, jack fruit and nase berry; and of the following list I am just as certain of rapid growth and early maturity, where they have the extra care and attention that is a necessity to their perfection; custard apples, chirimoya, lichee, wong po, Japanese persimmon, almonds, filberts, some varieties of apples, plums, peaches, apri-

cots, and several varieties of grapes. I am endeavoring to form a list of all fruit and nut trees with the proper soil, temperature, moisture and other conditions needed for the perfection of each kind, and also giving the native place of such plants, with directions as to the best mode of procuring the same, and much other information; but owing to the delay through mails, etc., from foreign countries, I am not prepared to furnish in the report now from its incompleteness, but as soon as finished I will furnish it for publication in the PLANTERS' MONTHLY, should my wish that the Planters' Labor and Supply Company continue its valuable existence be the case.

E. LYCAN,
Chairman Committee on Fruit Culture.

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## *REPORT OF COMMITTEE ON THE MANUFACTURE OF SUGAR.*

During these days of low prices and severe competition we cannot afford to overlook that method by which it is said the beet has gained so great an advantage over cane.

Diffusion it is said is the only rational way of extracting sugar from the cane as well as the beet for the following reasons: 1st. We shall extract all the sugar in the cane. 2nd. That owing to greater purity of the juice we shall obtain a larger per centage of sugar. 3d. We shall do it with a less expensive plant of machinery, less liable to serious breakage. Diffusionists tell us that we now throw away as much sugar as would pay the whole expense of manufacture, and that so long as we continue to do this, we cannot compete with the beet manufacturers. They tell us that diffusion will secure to us this large per centage now wasted, and put cane in a position superior to the beet.

On examination we find that our loss by crushing is certainly great, probably quite as great as generally represented. Undoubtedly diffusion will secure much of the loss for us, but we may well question whether it will save it all, as the sanguine would have us believe.

We have no doubt, that by the diffusion method all or nearly all of the possible sugar in the cane *may* be extracted, but the question is, will it be in practice. A laboratory experiment on a small scale may carry a process of manufacture to a degree of perfection that would be unwarranted in practice on a large one. Although the experiments in diffusion may show an extraction of 85 to 87 per centage out of the possible 88 per centage, say, probably the working practical extraction would range between 70 and 75 per cent. In this part of the world where labor and material, machinery and coal as well as capital are high, it will not pay us to go to the last extreme for the final vestige of sugar.

The ultimate object of the sugar business, at least so far as we are con-

cerned, is not to make sugar, but to make money. Even if by some unknown process we could get twice as much sugar out of the cane as we do now, there would be no object in doing so unless we could show a financial gain. Diffusion shows a sugar gain, does it show a financial gain? We think not for us.

Taking mill extraction at 70 per cent., which we believe is reasonable for a good single mill and low for a double mill, and 80 per cent. which is also reasonable for diffusion and we have a gain in juice, and presumably in sugar, in favor of diffusion over mill extraction of about 15 per cent., equal at present prices to about $11.25. This so far as we know represents the whole gain. But the cost of this gain will prove a very serious objection.

It is quite commonly stated that diffusion juice is of the same density practically as mill juice and therefore the question of evaporation will be no more serious than at present. This however does not appear in the various experiments that have been made in diffusion:

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|---|---|---|---|
| In Java, mill juice | 10.6 B. | Diffusion juice | 7.3 B. |
| Almeira, Spain, mill juice | 8.4 B. | " " | 5.5 B. |
| Torre del Mar, Spain, mill juice | 8.5 B. | " " | 3.5 B. |

While in the thorough experiment conducted by the Amer ican Government at Ottawa, Kansas, the diffusion juice stood 5.4 B., mill juice not given.

We believe it is pretty generally conceded that sufficient water remains in the juice to raise the weight of extracted juice to the original weight of the cane, *i. e.* if any extraction of 87 per cent. is made there will be obtained from the 100 lbs. of cane, 100 lbs. of juice, of which 20 lbs. is water of diffusion. On first sight it might appear that this meant only 25 per cent. more water to evaporate than in mill juice for which we get 10 per cent. more of sugar. But this view is misleading. The amount of evaporation to be done is not the whole 70 or 100 lbs. of the juice and the masse cuite.

The masse cuite may be put at 20 per cent. of the normal juice. In the case of the mill juice this would be 20 per cent. of 70 lbs.=14 lbs for masse cuite which taken from the 70 lbs. juice gives us 56 lbs. of water evaporated. In the case of diffusion juice we have 80 lbs. of normal juice, 20 per cent. of which is 16 lbs. masse cuite, and this from 80 gives 64 lbs. to be evaporated were it of mill density; but there are 20 lbs, of diffusion water, thus making a total of 84 lbs. of water to be evaparated from the diffusion juice, or an increase of 18 lbs. or 50 per cent. over the mill juice. Possibly under the most favorable conditions a ton of coal—without trash—will manufacture a ton of sugar, in which case about half a ton of coal would be necessary to evaporate this 50 per cent. extra of water. This half ton of coal will cost, delivered on the plantation from $6 to $8. In addition to this expense must be remembered the largely increased work required of the cleaning and evaporating departments of the mill necessitating either greater capacity or longer hours in order to accomplish the same work, so

that the margin of profit under even the above favorable conditions would be very small. But this is based on the supposition that we should still have in diffusion the trash that we now have in crushing and that it would be sufficient as now to evaporate the normal mill juice. Probably this is a mistaken assumption.

It has been hoped and claimed that the exhausted slices might be dried so as to be available for fuel, but so far as we can learn *every* attempt of the kind has been an utter failure, though pressure, centrifugal force and sun drying have been tried.

This difficulty is freely admitted by Wiley in his report. He says: "At the present time I will say there is no prospect of being able to use the material as a fuel outside of countries where the sun can be relied on to do all the drying" and even there we understand it requires to be spread very thin over 15 or 16 acres and frequently turned. With this a vision of hand labor rises before us such as must be fatal to such a scheme. Possibly some method may be devised by which these slices may be dried but the expense of manipulation will probably prove fatal to the financial success. At any rate, any one undertaking diffusion in the present stage of its progress, must necessarily be prepared to do the work without trash whatever his successor may do.

If then we have to buy fuel to evaporate not only the extra 50 per cent. of water, but the 100 per cent. besides and have only the extra diffusion sugar to pay for it all, it is very evident that for us at present diffusion is out of the question.

With respect to the purity of juice in diffusion the experiments do not show any great gain over the mill. To be sure albumen is present in much smaller quantities, but other impurities pass into the diffusion juice which seem to be much more injurious and difficult to remove than albumen, so much so that a carbonitation plant and filter presses for the chemical and mechanical purification of the juice seem to be a necessary accompaniment to a diffusion plant.

In regard to the cost of diffusion machinery, Wiley in his report gives us a very definite and exact statement. For a plant to manufacture twenty to twenty-five tons a day his estimates are:

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|---|---|---|
| Net cost of battery and cutter | $15,674 | |
| Net cost saturation plant for carb. acid gas | 6,085 | |
| " " filter press plant for above | 3,177 | |
| " " saturation plant for sulphurous acid | 1,755 | |
| " " filter press plant for above | 1,529 | |
| Total | | 28,221 |
| Cost of packing, freight and delivery in New York from Europe | | 5,793 |
| Grand total | | $34,721 |

This probably means about $50,000 ready for work on the plantation.

Considering the insignificant nature of the gain, the cost of fuel, the expense of the plant and our own comparative poverty, had we not better stick to our mills and let diffusion alone?

However, if any one feels inclined to move in that direction, the most likely scheme for us, so far as we can see, is the diffusion of the trash.

This has been done at Torre del Mar, in Spain, with what appears to be very good results, not inferior, it is said, to the ordinary method. By double or triple pressure, as much juice as possible is taken out with the mill, from which the trash is taken to the diffusors, ten in number, and there treated as chips in the ordinary method. It is evident that this method has advantages over diffusion pure and simple. The mills are still retained and made to do the bulk of the work; a much smaller battery for diffusion is required, and the juice is not diluted to such an extent as in the ordinary way. The mixed mill and diffusion juices showed a density of 6.5 B., while the clear mill juice stood at 8 B. Furthermore this mixed juice can be defecated in the ordinary method without the use of the carbonitation process. As Mr. Wiley suggests, however, it would probably be an improvement to run the trash through an ensilage cutter, to reduce it as nearly as possible to the form of the diffusion chips, when it could be more rapidly and readily worked than in the coarse state.

Any such diffusion of the trash, however, is fatal to its value as fuel, as it is fit only for fertilizer.

In conclusion we would suggest that for the present we leave to Java, the American government, or the grandees of Spain, the solution of the difficulties attending diffusion in any form. We have neither the time nor the money to attempt their solution.

Our recent move in the direction of double crushing and maceration promises results more easily obtained, of greater net value, and less purely theoretical. We have had several maceration mills running for a season, and are now in a fair position to judge of actual results. As a rule, the mill managers have considered that the extra sugar secured by macerating with water would not warrant its use to any extent, and the corresponding consumption of expensive fuel. Accordingly most of them have been content with dry double crushing, securing therefrom a gain of from ten to twelve per cent, with little or no extra cost of manufacture. Two of the mills however, have used water almost constantly, and have secured a gain over single crushing of from twelve to eighteen per cent. It is evident however, that the significance of this gain depends on the quality of the first crushing, and that figures of this nature may mean much or little according to circumstances. It is quite possible that in some cases the second mill is only helping the first mill to do work that it should do for itself, and that both together do only what one should. Probably a better way to put the matter would be as a per centage extraction from the cane. A good three roll mill, properly manipulated, will take an average of seventy per cent out of good juicy cane. The two roll mill with water, will take out from seven to ten per cent more, making a total extraction of seventy-seven to eighty per cent. To the inexperienced this does not seem a very large nor a very satisfactory extraction,

as it leaves from eight to twelve per cent. of juice in the trash. But any one who has tried it and summed up his results in figures, will know that he cannot possibly do much better, and is liable to do much worse.

The gain in juice from the second mill probably does not indicate a proportionate gain in sugar owing to the slightly lower density and greater impurity of the second mill juice.

As to the use of water in maceration, it is a question on which there has been no satisfactory conclusion arrived at, nor shall we perhaps be in position to arrive at a final conclusion until we have more accurate methods of getting at just what we are doing. It is of course merely a question of dollars and cents of outlay and return; but so long as we know neither what outlay nor return is, we can only guess at the course to be pursued. In order to be able to come to an intelligent decision in the matter a careful account should be kept of the fuel required to evaporate the water of maceration, as well as of other expenses resulting therefrom, say delay of the work, overtime, etc. Against this should be balanced the gain resulting from the use of water which may be arrived at by measuring quantities and polarizing qualities. If this is too much trouble it must remain a matter of guess-work.

There are certain broad limits however, within which it is comparatively easy to decide. There is a certain class of cane, rich, dry and woody, such as our over-ripe plant or most ordinary rattoon on which it undoubtedly pays to use water, supposing that a mill is properly fitted for evaporation. There is another class of cane, soft, juicy and under-ripe, on which it undoubtedly does not pay. Between these two extremes lies the great bulk of cane which is debatable ground, on which each mill must decide for itself according to the conditions of the case.

Necessarily the cost of fuel, setting and efficiency of the boiler, nature and capacity of the means of evaporation will enter as very large factors in the problem; for most mills have shown by practice a decision unfavorable to the use of water, but whether this decision is based on any intelligent examination of the conditions is doubtful.

We believe the best results, whether with or without water, are to be obtained by getting the highest possible extraction with the first mill, and the balance little or much—whatever can be got with the second. It is the result of experience that a total extraction of 80 per cent. is much more likely to be obtained, in the aliquot parts 70 per cent. and 10 per cent. than in the parts 65 and 15 per cent. A portion of 15 per cent. will almost surely be missed by the second mill.

We would earnestly recommend as a guarantee of efficiency, especially suitable to the depressed condition of the business, that means be taken to secure an accurate, daily knowledge of the degree of the extraction made by the mills, which may be arrived at by weighing either the cane or trash and measuring the juice. We are confident that such knowledge would lead to better results.

Having got the juice out of the cane, we believe there is no more im-

portant operation in the manufacture than the cleaning, nor one more often imperfectly done. When rightly done, the result is almost necessarily good sugar both as to color and quality. When improperly or imperfectly done, the result is almost necessarily poor sugar, both as to quality and quantity.

The cleaning depends, we believe, most intimately on the liming which therefore becomes a precedent condition to cleaning. When the liming has been correctly done, the juice cleans with the utmost readiness, when it has been carelessly and incorrectly done thorough cleaning is next to impossible. Being a simple operation, this liming is often left to the discretion of an ordinary mill hand, who has a very imperfect conception of what is wanted, and applies an unvarying quantity of lime to varying qualities of juice. It is our opinion that the liming should be very carefully and intelligently done, and should be closely under the eye of the sugar boiler himself.

Another important step in the cleaning of juice is the precipitators, or where the liquid is allowed to settle and part with much of the heavier impurity by precipitation. Many mills have not provided themselves with the precipitators for the process, and it is not generally considered a cardinal nor perhaps important step in the treatment of juice, but we believe there is a growing conviction of their value, and we are convinced,—considering their slight cost and undoubted effectiveness, that no mill should be without them. Undoubtedly juice may be thoroughly cleaned without the process, but it is evident, that, so far as it is effective, no method can be cheaper than simple gravitation and that whatever impurity can be thus easily removed is so much clear saving to the cleaning pan or other methods that may be used. In fact we believe that throughout the whole process of treating juice, plenty of time should be allowed for precipitation of impurity, and that in no case is it the part of wisdom to rush it through, unless there be danger of deterioration. We know that a large amount of dirt is thus readily and unexpensively removed, which would otherwise have remained in, or been taken out at a considerable cost in the cleaning pan. Care should be taken to secure good rings round the plug boxes of the precipitators to prevent the exit of the settling with the juice, or better still, the juice should be drawn off by means of floats.

### THE CLEANING PAN.

There is a right and wrong about a cleaning pan as about everthing else in a mill. It is a mistake to suppose that any kind of a pan with a coil in it, so that it will stew up the juice, is a cleaning pan. The proper cleaning pan should not be too deep; should have a double or triple coil with a good supply of steam, and a cooling space at the end of about one-fifth of the surface.

Since the introduction of double crushing and maceration the juice has

been undoubtedly much more difficult to clean than before, owing probably to the greater amount of impurity extracted by the heavy pressure and the fine particles of trash carried with the juice. So serious is the trouble that it has been suggested at various times that the juice be filtered through filter presses the same as the skimmings.

Experiments were tried at Laupahoehoe and Waiakea with a view to accomplishing this end, but they proved a failure, owing to the gummy nature of the deposit on the filter cloth, which almost immediately stopped the working of the press. In order that such a method should be a success the process known as carbonitation would probably have to be adopted. In this process the juice is heavily limed, and the lime then precipitated by means of carbonic acid gas. The lime combines with the impurities held in the juice, and carries them down with it, so that filtration is accomplished without difficulty and a beautiful pure juice is obtained. It seems probable that such a method might be well worthy of trial, and likely to give good results. The difficulty is the expense of obtaining the carbonic acid gas. The method usually adopted for this purpose is that of burning lime stone in a large kiln which necessarily consumes a large amount of fuel and consequent waste heat. Possibly some way might be arranged by which this heat might be utilized.

Some mills have adopted the method of double cleaning by which the syrup is returned to the cleaners after evaporation and there subjected to a second cleaning. For mills well supplied with the necessary cleaning capacity, this method we think a wise one, as there is undoubtedly a great deal of very gummy impurity thus removed which would otherwise have gone into the sugar. The objection that invert sugar results from the process, does not seem to have much weight, as very careful analyses made at Hakalau show that very little invert sugar is made outside of the vacuum pans in an ordinary mill. Nor is the question of steam a serious one as the extra steam required is probably nearly balanced by the readiness with which graining is accomplished in the pan and drying in the centrifugals.

Double and triple effect. It has been an open question heretofore among mill men as to what saving of fuel was effected by the triple effect over the double. It was generally admitted that there was an advantage in using the triple effect, but no one knew how much of an advantage. As a contribution towards the solution of the question, the following experiment was tried at the Kaiwilahilahi mill August 29th, 1885.

Double effect—3,635 pounds of water were evaporated by 2,136 pounds of steam, or 1.70 pounds of water to one pound of steam.

Triple effect—4,216 pounds of water were evaporated by 1,869 pounds of steam, or 2.25 pounds of water to one pound of steam, showing a gain of thirty per cent in favor of the triple effect over the double. In both cases live steam and equal pressures were used, and the steam condensed

and weighed as water. This gain corresponds very fairly with results deduced from the consumption of fuel at the same mill.

The efficiency of either double or triple effect depends very largely on the condition of the drums. If they are clean, the evaporating will be economically and rapidly done. If they are dirty, the reverse will be the case. Mill managers cannot be too particular in having them kept clean, especially in case of maceration or double crushing. Probably in many cases it will be necessary to have the drums cleaned in turn every night. A small expense there will insure golden returns in economy of fuel.

Crystalizing in the pan. The most profitable grain for No. 1, does not seem to have been authoritatively settled, some being contented with a fine grain, while others strive for a very coarse one. Probably, on the whole, the best results come from a happy medium, with a tendency towards the larger grain. Perhaps evenness of grain is more important than size, and more important than either is the hardness of the crystal consequent on raising the temperature of the strike near the seed. Sugar of this quality will be almost sure to polarize high and keep well.

The masse cuite should be boiled as stiff as possible, and to this end the mixer should be placed in close proximity to the pan, under it if possible, or at any rate so that there may be plenty of fall and no tendency to choke and delay the discharge. For the same reason the pan should be supplied with a large free outlet so that there may be no excuse or temptation for a thin strike.

No. 2. Although there is a prevailing impression that graining No. 2 in the pan produces better results than boiling to proof, still that process has not been by any means universally adopted, and some good sugar boilers maintain that the old fashioned way of boiling to proof is after all the best. Whether this opinion however is settled to much weight we do not know; we have heard of no conclusive facts to sustain it. As a contribution to the solution of this question, the following experiments were made at the Laupahoehoe and Kaiwilahilahi mills;

Laupahoehoe Mill, April 28th, 1886.

| | | | | | |
|---|---|---|---|---|---|
| Grained— | Polarization of Molasses 55 per cent. | Polarization of Sugar 94.7 | Sugar, | 6649 lbs |
| Proof— | " " " 61 " | " " " 94.5. | " | 5700 lbs |
| Difference..... | | | | 949 lbs |

Gain in favor of graining, 17 per cent.

Kaiwilahilahi Mill, August 3d, 1886.

| | | | | |
|---|---|---|---|---|
| Grained— | Polarization of Molasses 54 per cent. | Polarization of Sugar 94.2 | Sugar, | 7500 lbs |
| Proof— | " " " 54 " | " " " 94 | " | 6400 lbs |
| Difference..... | | | | 1100 lbs |

Gain in favor of graining, 17 per cent.

This is without taking into account the difference in polarization of the molasses which in the first case would give proof an advantage.

Of course this is not entirely conclusive as the discrepancy *might* be made up in the No. 3 following from the second molasses; but so long as the method of procrastination is not *proved* to be better, here in the ex-

traction of the sugar from the juice, as in the extraction of the juice from the cane, it is doubtless the part of wisdom to take all we can at each step. A bird in the hand is worth two in the bush—to say nothing of the comparative values of 2 and 3.

It is a question whether we should market our lower grades. Poor qualities of No. 2 and 3 reduce the price to a very low figure, owing to the reduction of an eighth of a cent for every degree of polarization under 96.

It is quite evident that with sugar at four cents a pound the allowance of one-eighth of a cent for every degree of polarization is out of all keeping with the price, and that it is to our interest to get as many of those eighths as possible. With the Manila basis, it was quite possible to secure one cent a pound beyond the normal price, or a premium of twenty-five per cent, for a rise in sugar value of less than ten per cent. Accordingly, when we ship away impure sugar, that is, sugar and dirt with a polarization of ninety-one, we get twenty-five per cent less for it, while we increase the weight only ten per cent. A consequent loss of fifteen per cent.

Aside from this, the deterioration on the way to San Francisco is very great, and we have to pay freight and find containers for a great deal of material for which we get no return.

All this may be avoided by returning these lower grades, little by little, to the cleaning pans, where they are melted up with the juice and converted into No. 1. No appreciable injury is done to the juice as the whole product undergoes the cleaning process. From careful experiments it is evident that No. 2 is quite as pure as ordinary juice with which it is melted, and this might reasonably be expected because the juice contains not only Nos. 1 and 2, but 3 and 4, and waste molasses, whereas, in the case of No. 2, the lower grades have been thrown out. Of course there are practical questions to be considered; questions of time, mill capacity, labor, etc., but taking all these into account, we think the process will pay in a great many cases. This process has been adopted by one mill and gives practical as well as theoretical satisfaction.

Molasses. Very little progress seems to have been made in the working of this obstinate material which still continues to carry off too much of our good sugar, in spite of all we can do. Many mills have undertaken the manufacture of No. 4, but so far as we can learn, when the molasses has been thoroughly and properly worked in the earlier stages of No. 2 and 3, the results from No. 4 are not encouraging. The very same impurities that prevent the sugar crystalizing as No. 3, prevent it crystalizing as No. 4. It seems probable that we shall never secure much more of the sugar until we find some way of removing those impurities which prevent crystalization.

Of the various methods recommended for this purpose the Osmose process promises the best results at least for us. We believe an Osmose press

has recently been imported from Germany for the purpose of testing the process, but as yet no trial has been made. We are not over sanguine as to the results however, because of the chemical constitution of our molasses, which is somewhat different from that of the beet for which the Osmose press was designed.

Finally we desire to call attention to the great importance of systematic work in the mill and an accurate knowledge of what is being done. Each mill manager should know the quality of extraction he is getting from his mill or mills, the exact amount and quality of his juice, the polarization of the sugar, and the loss in manufacture. When we know these things we shall be in a position to secure the best possible results; until we know these things we are but struggling along in the dark.

J. M. LYDGATE.

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## *REPORT OF THE COMMITTEE ON LEGISLATION.*

*Mr. President of the Planters' Labor & Supply Company*—In order to make an intelligent report on legislation, I copy from Article 1 of our By-Laws the following, as a text for my report, viz: "And having for its objects the importation of labor, the improvement of the industry of sugar raising in this Kingdom, and the general benefit of its stockholders." I wish to call your attention to and to emphasize the last clause, "and the general benefit of its stockholders." From the above it appears that we have the right to legislate upon all subjects that we consider beneficial to us, whether of a financial, political or moral nature.

Under the heading of "Financial Benefit" I will call your attention to two laws of this Kingdom, the rum and opium laws, which we consider mischievous to our financial interests, and in this way: If a company of men, either by law or legerdemain, so injure my horse that I can get only a part of the service out of him that I formerly could, they take so much of my property from me and rob me of so much benefit; or if they so injure my help by free opium and liquor laws that I can get only a part of the benefit from them that I pay for, I have a right, you have a right, this Planters' Association has a right to protest, and to take action to prevent this loss, which in the aggregate is large. Every plantation manager and every overseer will tell you that they suffer great loss during the year from the use of rum, and now that the free use of opium is added, our interests will be still more injured, and we can and must protest and legislate for the general benefit of stockholders. Not only are planters injured by the evil working of these vicious laws, but merchants and the general public are also injured, as there is less property for trade

and traffic by many thousands than there would be if labor was not injured by these debasing evils.

POLITICAL BENEFITS.

While former Cabinets were piloting and steering the ship of State, with Mr. Spreckels behind the curtain as prompter, we felt safe, although things were not quite to our liking; but now I feel we are drifting—drifting upon an unknown sea, with neither compass, chart nor rudder, and where we will fetch up no one knows. We felt safe under the pilotage of former Cabinets, because we knew them to be intelligent, and sprung from the ruling race. I have an exalted idea of the high destiny of the white man and of his power to control and govern both men and elements.

The word in the beginning seems to have been spoken to the white man, when he was commanded to "subdue the earth and have dominion over it." Europe was given to the white man, America to the red man, Asia to the yellow man and Africa to the black man. And with slight exceptions the white man is the only one that has ventured beyond the "bounds of his habitation." He has over run Europe, and crossing the Atlantic westward has taken possession of America, and is "monarch of all he surveys" from Cape Horn to Behring's Strait. He has stepped across the Pacific Ocean, leaving the imprint of his enterprising foot upon the various islands of the sea; he has taken possession of Australia and India, with their countless thousands; he has gone to Africa, and this time to stay, you bet—this time, it will not be a Mongo Park, a Livingstone, a Baker or a Stanley, as a traveler or explorer. The coming of the white man to Africa means government, enterprise, agriculture, commerce, churches, schools, law and order. It will be better for the colored man to have the white man rule. It is better for the colored man of India and Australia that the white man rules, and it is better here that the white man should rule, not that he should hold the offices and be King, but he must do a large share towards making the laws and then seeing that they are obeyed by the King and people.

MORAL BENEFITS.

Years ago, when the first missionaries landed upon these Islands, they found the people truly "children of nature"—innocent, hospitable, unschooled and untaught, living in the rudest way, laboring but little even to secure comforts, with no commerce and little agriculture, and with crude ideas about property. But the native was taught how to increase his comfort by labor, which he has done to some extent, but he does not like it. He has learned that civilized Governments require officers. The offices he likes—most men do when the salaries are large—for he has learned that it is an easy way to get a living. He has also learned that to support a civilized Government and pay its officers requires money, which is taken from the people by law in the way of a tax. These things

he has learned, but he has not learned yet of the sacredness of money taken from the people by process of law, and the personal and moral obligation of every officer to restore to the people full value of every dollar taken from them by process of law, and that the people will hold him strictly accountable for it. This he has not yet learned, and he must be taught it by the white man, and you, gentlemen, must teach him. All that the native seems to comprehend now is, first to get into office, and if his salary is not large enough to support his fancied dignity, he must raise it; and if the money is not in the Treasury to pay his checks, he is to take it from those who have it by process of law, as he has been taught. So, almost without discussion, without consultation with the parties most affected, in a hasty and undignified manner, and by, as it were, a wave of the hand, thirty-three and one-third per cent. is added to the tax roll of the Kingdom. This, I say, the native has been taught by the white man, but he does not yet realize that to all this power there are necessarily some bounds and limits fixed, as well as the moral and personal obligations attending it. And, further, he does not realize the danger there is in taxing people without their consent. An unwarranted use of this power has upset the authority of powerful nations and caused the shedding of much blood. The white man has organized for the native a Government, placed the ballot in his hands, and set him up as a law-maker and a ruler; but the placing of these powers in his hands before he knows how to use them, is like placing sharp knives, pointed instruments and dangerous tools in the hands of infants. They do not yet realize the effects of their own acts even upon themselves; hence they want teaching. You must teach them; do not take these powers from them, but teach them how to use them, so as not to injure themselves and us. It is now painfully evident that our last Legislature and the preceding one were handling edged tools, and in a manner dangerous to this Kingdom, injurious to the people and to the health of the natives. I need only refer you to the two laws upon opium and rum to make most of this apparent, while the Government's Genealogy Board, armies and other follies clinch the argument.

The danger to the natives lurking in the "Indulgences" laws above referred to, being in their nature death-dealing, will destroy many natives to one Chinaman, and hundreds of natives to one white man, so that the natives will waste away unless they are saved by the white man —by you, gentlemen, and the white people outside of these walls. You must, under God, save their bodies as the missionaries tried to save their souls. Where there is a will there is a way, and the white man, belonging as he does to the dominant race of the earth at the present time, and possessing as he also does a goodly share of intelligence, always finds a way to carry out his projects, whether they be laying cables, running railroads, exploring the heavens, or governing among the nations. Hence, I take it, you have a right, under your charter and by-laws, to save this Govern-

ment and people and to protect their interests, whether and by whatever means you think best, and whether these interests be financial, political, moral or legal. And it is the duty of this organization to protect their own interests, whether they be assailed by taxation or by immoral or extravagant laws.

We now ought to call upon all the people of these Islands, of all nationalities, who have the welfare of this country and people at heart, to come to the help of the Lord against these mighty sins of intemperance, extravagance and folly, and by their acts protest against those laws that have opened the flood-gates of intemperance and let loose the juggernaut of hell to roll over and crush the weak victims of intemperance.

This, doubtless, will be set down as "Politics." All right; politics means the science of government, and, if not polluted, good government. When an individual thinks he can shut the mouth of an American, a British subject, or a German, when he talks of taxes or sumptuary laws, by simply calling "politics," he is much mistaken.

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# CORRESPONDENCE.

## *CONCERNING THE FILTRATION OF CANE JUICE.*

EDITOR PLANTERS' MONTHLY:—Having, together with several enterprising planters, been for some time experimenting with a view to filtering our cane juice by presses as it leaves the clarifiers, instead of torturing it as we now do in cleaning pans, I would ask you to publish the enclosed article from the *Argosy*, which through the kindness of R. A. Macfie, Esq., of Kilauea, Kauai, I am enabled to hand you.

Yours Truly, ALEX. YOUNG.

### A NEW PROCESS.

In times past numerous attempts were made to make use of the many and conspicuous advantages possessed by the filter-press for the filtration of cane sugar solutions. For a long time all such attempts failed, either on account of the gummy and mucilaginous matters present in the cane sugar solutions being deposited on the cloth and so arresting filtration; or else the large surface of iron and lime presented by the plates of the filter-press and the cakes which it contained were found to have a darkened effect on the sugar solutions so filtered. From these and other causes the filter-press, with all its acknowledged advantages, has been discarded by Manufacturers and Refiners of cane sugar, and has been used to a limited

extent merely for the filtration of the skimmings, bottoms &c., of some plantations, or has been given over to the undisputed possession of the manufacturers of Beet sugar.

A change has however taken place, and by means of a simple press at present being introduced into this colony, the filter-press is made available for the filtration of cane juice. The new process is called the "Kleeman" or "Brown Coal" process. The peculiar action of brown coal on sugar liquors was discovered and patented by a German named Fritz Kleeman, in 1884. This patent was purchased from Mr. Kleeman by "The Sugar Refiners Appliances Co., Limited," of 139 St. Vincent Street, Glasgow. The substance used in this process is known under the name of Lignite, Brown Coal, Moss Coal, Peat Coal and Tertiary Coal. It is simply vegetable matter in an intermediate stage between peat or "pegass" and carbonaceous coal. Indeed, so closely does peat, in many cases, approach the nature of brown coal, that it was considered necessary for the patentee to include that in his specification.

Brown coal is widely distributed over the earth as true coal. It is found in France, Italy, China, India and New Zealand. In the United States of America there are numerous deposits of this substance in the State of Vermont, and all along the banks of the Mississippi. In the Northwest territory of Canada there are deposits of it 2000 feet thick. In Ireland, on the shores of Lough Neagh, there exists a deposit of this substance extending over an area of 10 miles long by five miles wide, and averaging about 60 feet in thickness. In the wilds of Devonshire at Bovey-Tracey there also exists a very extensive deposit; a deposit, which by the way is. at present being worked in connection with this process. The great storehouse of brown coal, is, however, Germany; there, in many parts, nothing but brown coal is used as fuel, both in the furnace of the factory and the stove of the cottage. It is also used for various manufacturing purposes.

To prepare the brown coal for the Kleeman process nothing is necessary but to reduce the coal to a fine powder, an operation which is very speedily accomplished by means of a disintegrator. This powdered coal is added in certain quantities to the sugar solution and intimately mixed. The temperature of the solution having been raised above 150° F., the whole mass is at onced forced through the filter-press; the filtered liquor comes from the press bright and clear, having parted not only with its grosser impurities, but also with a large portion of its color. If sufficient brown coal has been added, none of the usual drawbacks attending the use of the filter-press will be observed. The brown coal, by its absorptive properties, catches up and absorbs the gummy and albuminous substances present in sugar solutions, and by preventing them from being deposited on the cloth, allows the liquor to flow freely from the press. The resulting cakes are hard and dry, and can be at once used with other fuel in the furnaces of the steam boilers.

This process has been in use with marked success for some months in various sugar refineries in London, Greenock, and Amsterdam, and in Boston in the United States of America.

The attention of Mr. Quintin Hogg having been drawn to this process, and its applicabily to the manufacture of sugar suggested to him,—after seeing the process in practical operation in one of the London refineries, he at once arranged to have a large quantity of prepared brown coal sent out to this colony, along with a gentleman practically acquainted with the use of this process in sugar refining.

Unfortunately, Mr. D. M. Service—the representative of the Sugar Refiners Appliances Co.,—having first to proceed to the United States, did not arrive in this colony until the end of June, too late for last season's work. Before his arrival, one small trial of the process was made at Plantation *Non Pareil* under the superintendence of Mr. Garnett, and proved to be a marked success.

Since his arrival here, Mr. Service has made a number of experiments and trials with this new process on various plantations. Experiments have been made at *Lusignan*, *Enmore*, *Annandale*, and *Aurora*. In every case very gratifying results have been obtained.

The method adopted by Mr. Service is as follows:—The cane juice having been treated in the usual manner until it reaches the clarifiers, i. e., heated, tempered, and if necessary, sulphured, a quantity of brown coal, equal in weight to from 10 to 30 per cent., of the indicated sugar present in the juice is added and intimately mixed. If the temperature has fallen, it is necessary that it be again raised to between 180° and 200° F. but not higher. The brown coal being now properly mixed, the whole mass, bottoms, skimmings, coal, &c., is all forced into the filter-press. The juice flows freely from the press, beautiful bright and clear, and of a light straw color. Not a single trace of flocculent matter can be observed in it; and when it is submitted to either a heat or chemical test, no trace of albumen can be observed. The juice is now ready for the triple effect. After having been concentrated in the triple, it will be found to have acquired a dark color and a muddy appearance: this is caused by the separation and solidifying of certain impurities in the juice by concentration. To produce a perfectly pure sugar, and to obtain the full benefits of this process it is necessary to mix with the concentrated syrup a quantity of brown coal equal in weight to from 5 to 10 per cent. of the indicated sugar present in the syrup; the temperature of this mixture having been raised to between 150° and 170° F. the whole is allowed to run by gravitation through a small filter-press. The syrup coming from this press is bright and sparkling, and has a light lemon color. The gummy matters having been removed by the first filtration, no pressure is required for this second filtration. The cakes from this second filtration are used, after removal from the filter-press, for treating the juice for first filtration, thus no extra coal is required for second filtration.

By this new process the whole of the old cumbrous and wasteful arrangement of eliminators, subsiders, copper walls, and settling tanks, is done away with. The cane juice instead of remaining exposed to the deleterious action of the atmosphere for a length of time varying from five to twenty hours, is made ready for the triple within one hour from time of expression, and this by means of appliances at present in use on many estates. The treated juice when boiled in the vacuum pan is found to grain much more freely than the common juice, and is free from all stickiness.

Mr. Service has been experimenting with the vegetable substance known in the colony as "pegass," and he finds it either in whole or in part to be a very good substitute for brown coal. It decolorises as well as, if not better than, brown coal and gives a good and speedy filtration.

It is possible that the pegass from one district may be found to be better than that from another. It may also be found necessary to partly dry and grind the pegass; these are questions which can only be answered by practical experiment. The fact remains that in pegass the colony possesses the means of filtering and purifying the cane juice in a manner such as no system of settling and skimming could do.

The advantages claimed for this process are briefly these: speed of filtration; increased yield of sugar partly on account of the greater purity of the juice, but principally by avoiding inversion; a better class of sugar obtained without the use of chemicals. As to what extent such claims are made good, must be a question of time and careful observation. We understand that the process will be adopted on several estates for next season's work. In the mean time two samples of juice from Plantation *Aurora*, one treated with pegass, the other with brown coal, may be seen at the office of this paper.

The process has been patented in this colony and the Islands. Whether the ligneous deposits in the island of Trinidad will be available for the process has not yet been ascertained.—*Demerara Argosy, July* 24.

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## *NOTES ABOUT SOME OF THE MILLS IN THE HILO AND HAMAKUA DISTRICTS.*

EDITOR PLANTERS' MONTHLY—SIR:

The cane all through these districts, with one or two exceptions, is looking in splendid condition. In fact, all the planters seem to be straining every nerve, and are exerting themselves to the utmost, trying everything, doing everything they possibly can, by improved methods of cultivation and good management, to improve the land, to increase the yield, and to place their plantations on a paying basis. A few of them have fortunately succeeded in this, but the majority have met with poor

success. There are three or four plantations where good crops are seen every year; but in most places there is a falling off from year to year, and the yield is decreasing from three tons to two tons, with indications of still further decrease.

All of the mills are now through grinding for the present, both in Hilo and Hamakua Districts, and will not start up again until December or January. Some of the planters prefer starting up even later, as the cold rains in December and January greatly retard the growth and maturing of the rattoons, and in some cases seriously injure them. In nearly every mill one sees some improvement being made for the purpose of reducing expenses and for the better extraction of the juice.

### WAIAKEA MILL.

They usually take the lead in this direction, and spare no expense, when they see any possibility of improvement. Just now they are trying an experiment in steam-boiler setting, which, if found successful, will undoubtedly prove a great saving of fuel, as well as a saving to the boiler itself. The old setting was what is known here as "Hinds' compound boilers"—that is, one Cornish and one multi-tubular boiler set tandem; the fires being under the Cornish boiler, and the gases passing through both, and thence to the chimney. But in this instance the furnace is in front of the Cornish boiler, and the gases passing through both boilers, return on one side and back again on the other to the chimney, the gases passing along the boiler three times. This change, it is thought, will greatly increase the efficiency of the fuel. This setting is a new departure for compound boilers, although it is common for single boilers of the Cornish type, and is considered the best possible setting for them. This matter is of far more importance than is generally supposed, as there is often as much heat going up the chimney as there is utilized by the boiler, and which, if saved, would often show a handsome dividend at the end of the grinding season. They are also making some changes in the boiling-house, for the convenience of the work, so that each part can progress in the same proportion and avoid delay. Besides this, they are erecting scales for weighing the trash, and intend to accurately measure the juice, for the purpose of ascertaining each day what per cent. of juice has been extracted, and for the purpose of comparison, so that one day's work can be compared with another. This method has been tried by the Lydgate Sugar Company at Laupahoehoe, and found to be one of the best means of securing efficiency and economy.

### WAINAKU MILL.

This mill not many years ago was considered one of the poorest on this island; it is now classed among the very finest, and with good reason. The three-roller mill is fitted with an hydraulic pressure regulator, which is said to be one of the best means of securing even grinding.

They are now putting in a maceration mill, which, with all the other improvements, places this mill in the front rank for completeness.

PAPAIKOU MILL.

Important changes are seen in this mill. The new boiling house, double effect and maceration mill have been found great improvements, and have given the best satisfaotion. The new contract has apparently worked satisfactory to all parties.

PEPEEKEO MILL.

If appearances count for anything, this mill is certainly one of the best on this island. Everything about it is of the latest design and best material; the boiling-house is a model of neatness and symmetry; everything is well arranged, convenient to work, and kept in good order. They have a Putman engine, with a three and a two-roller mill of the most approved make. The steam boilers are of the tubular type, and set according to the Jarvis fashion. Since making some improvements in the furnaces, they have given the best satisfaction. The boilers are fired from the top of the furnace, instead of the front, as is usually the case; and this is said to be a great improvement, as there is no possibility of any cold air getting above the fire. I was agreeably surprised with this mill. I thought it was not worth looking at, but found it a real pleasure to inspect it.

HAKALAU MILL.

They are putting in two maceration mills here, or rather are getting ready to put them in.

KAIWILAHILAHI MILL.

Great efforts are made at this mill to extract all of the available juice from the cane. For this reason both mills are set as close as possible, the first mill extracting 70 per cent. on an average. Water is then freely used, so that the second juice is reduced from 3½° to 5° B., according to the kind of cane being ground. Generally the harder the cane the more water is used. For getting the true density of the juice, a small quantity of juice is taken from every 50-gallon tank of the second mill; at the same time a small quantity is taken from the first mill, and a like quantity from the mixed juice, all kept separately and polarized separately every night by the manager. A sample is also taken from every strike of sugar, one from the waste molasses, and occasionally one from the mud press, and polarized. The new system of weighing the trash and accurately measuring the juice, is found to be a great improvement, as it shows the actual amount of juice extracted every day, as well as giving a true means of comparison, which alone is considered a great advantage. They are now putting in an Osmore press, for the purpose of extracting the salt from the waste molasses. By this means it is thought a greater quantity of sugar will be saved and the waste reduced to a minimum. A

new process of cleaning the juice is contemplated, but nothing definite is yet settled.

HAMAKUA MILL.

This, like some other mills, has taken a great leap to the front. Not many years ago it was one of the poorest investments; now it is considered one of the best. It has all the latest improvements in crushing, evaporating and manufacture, and everything is done on a modern basis. They are now putting in scales to weigh the trash and a meter to measure the juice, and are making other improvements. The boilers at this mill are the same as at Pepeekeo mill, with the exception of the furnaces, are fired at the top, and are said to work well.

PAAUHAU MILL.

Since being remodeled and put in working order, this mill has been doing splendidly. They are now about to put in a maceration mill, which will still further increase its efficiency and capacity.

PACIFIC MILL, KUKUIHAELE.

They have been doing first-class work with this mill, and have ground an immense amount of cane. They are about to put in a maceration mill, making five, in all, in these two districts. I believe there is one soon to be put in at the Honokaa mill. These mills were all made at the Honolulu Iron Works, which speaks very highly for home manufacture. They certainly deserve credit, for they are by far the best two-roller mills seen on these Islands. From general observations I noticed that those double-effects and triple-effects work the fastest which have the greatest number of tubes, and consequently the greater amount of heating surface. Also, that those furnaces that are fed or fired automatically (or even by hand) from the top, are more economical than those fired from the front, and the best grinding is apparently done in those mills which have some means of making daily comparisons, and the best sugar is made when precipitators are used.

I remain yours respectfully, O.

Hawaii, October, 1886.

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## *"WHY THE SUGAR BUSINESS DOES NOT PAY."*

EDITOR PLANTERS' MONTHLY:

Trusting that you can spare me the space, I should like to address the planters and mill-owners connected with the sugar industry in this Kingdom through your columns.

I notice in a recent issue of the PLANTERS' MONTHLY an article by one of the best-known mill-men in the country, giving reasons "why the sugar business does not pay." He has undoubtedly hit the nail on the

head; but while doing so has unwittingfy fallen into an error by specif y-ing a certain apparatus, and, by his giving estimates of cost and returns, his communication may be the means of leading others to take an incorrect view of this special machine and its uses.

An authority says "that perfect combustion is attained when the fuel is injected *continuously* to the fire as dust, when the minimum of twelve pounds of air per pound of combustible is supplied." It is not my object to discuss the manner of supplying the necessary quantity of oxygen to a furnace, but I wish to say that the application of automatic trash feeders to boilers is designed, in the first instance, to utilize the fuel (trash) to the very best advantage by *continuously* admitting sufficient to the fire to keep up the requisite steam power. A point that should recommend itself to all progressive men, more especially at present, as auxiliary fuel is so expensive; secondly, to make it possible to feed furnaces so that no air is admitted to the furnace but what comes through the fuel or through hot-air pipes, wherever they are used, thus making an exact regulation of the oxygen supply an easy matter, and insuring almost perfect combustion, and also preventing any cold draft from sweeping through the boilers, causing sudden contractions and the unavoidable strains incident to such, as every engineer knows. This may be emphasized by the fact that, with the best firemen (who cost plantations more than $25 per month). the fire-door is open about one-sixth of the time, allowing a very considerable volume of cold air to rush through the flues, causing imperfect combustion and shortening the life of the boiler; then, thirdly, is designed to require less manual labor, and that of a cheaper grade, one man being able to attend to two boilers with ease, if they are machine-fed, whereas it is just as much as one higher paid man can do to attend to one boiler by hand firing.

It will be seen that the reduction of the labor is the least of the objects sought in the introduction of machine-fed furnaces.

It may be of interest to state what the difference in the value of the trash, as fuel, is for single and double dry crushing. Assuming that the extraction is for the former 70 per cent. and for the latter 80 per cent., and also assuming that the mill, with its single crushing plant, vacuum, evaporating apparatus, etc., does all its work with green trash, burnt in a step-grate furnace, with hand firing, then:

| | | |
|---|---|---|
| Trash, at 70 per cent. extraction, contains— | Water | 15.02 ℔ cent |
| | Sugar | 3.08 ℔ cent |
| | Ligneous matter | 11.00 ℔ cent |
| Total | | 30.00 ℔ cent |
| Trash, at 80 per cent. extraction, contains— | Water | 7.02 ℔ cent |
| | Sugar | 1.08 ℔ cent |
| | Ligneous matter | 11.00 ℔ cent |
| Total | | 20.00 ℔ cent |

Neglecting the water in the trash, it will be seen that at 70 per cent. extraction the fuel is, in round numbers, 15 per cent. of the weight of the cane, and at 80 per cent. extraction is about 13 per cent. of the weight of the cane; therefore, the relative values of the trash as fuel, at the stated extractions, are as 15 is to 13.

It will be seen that other things being the same, the mill that with a single crushing plant does its evaporating with green trash alone, will, with dry double crushing, have about 15 per cent. more water to evaporate per pound of trash, which of course means that much more fuel, or a method of using the fuel at hand to better advantage; and as the automatic trash feeder is a means to that end, it most certainly should be given the place it deserves in the estimation of all mill-owners and planters.

Thanking you for your courtesy, I am, truly yours,

J. N. S. WILLIAMS,

Agent Risdon Iron and Locomotive Works, San Francisco.

Honolulu, October, 1886.

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## *FACTS AND FIGURES.*

EDITOR PLANTERS' MONTHLY:

The report of the committee on the manufacture of sugar, as published in the *Hawaiian Gazette*, contains some errors, which will seriously mislead one who does not follow the figures closely enough to detect them. The chief error is one that occurs not infrequently in expressing results by means of percentages. One thing is taken as the unit and a certain per cent. of that is transferred to another by a slight of hand.

In discussing the value of the diffusion process, the report starts with 100 lbs. of cane as its unit, and arrives at an increase of 50 per cent. in the amount of water to be evaporated, which is correct as far as the 100 lbs. of cane is concerned; but when it goes on to estimate the amount of coal necessary to manufacture a ton of sugar, and says that "about half a ton of coal would be necessary to evaporate this 50 per cent. extra of water"—it is not correct, as according to the figures of the report the sugar obtained by the diffusion process will be 15 per cent. greater than by crushing. So the water to be evaporated in manufacturing equal amounts of sugar by the two processes will be only 31.2 per cent. greater by diffusion.

Moreover, if it is true that a ton of coal—without trash,—will manufacture a ton of sugar, it is not exactly fair to say it will take half a ton of coal to evaporate 50 per cent. extra of water; as a considerable proportion of the fuel used in *manufacturing* sugar is used in the processes preliminary to the *evaporation*.

Having estimated the item of cost of a diffusion plant to manufacture twenty to twenty-five tons a day at "$50,000 ready for work," the report asks if we had not "better stick to our mills and let diffusion alone?"

If it is a question of throwing out a crushing plant in good working order, the inference may be wise, but if it is a question of putting up new plant, the advantage is at least $50,000 on the side of diffusion. The suggestion that a compromise method would be more likely to succeed, viz: diffusion of the trash, puts out of sight altogether the fundamental theoretical advantage of diffusion, which is that the juice being extracted without crushing the cells contains much less extraneous matter to be removed.

I do not wish to be understood as trying to make a strong plea for diffusion, as I do not know enough about the process to commit myself to it; but wish to show the importance of the greatest accuracy in such calculations. When prices have reduced the margin of profit to a very low figure we must take great care of the fractions. Mr. J. Owen Alexander, in a letter published in the October number of the *Sugar Cane*, gives some figures to show that the work of ex-Governor Warmouth at Magnolia is nearly, if not quite, equal to any results obtainable of diffusion, and certainly shows remarkably good results; but when one link in his calculations is, "I think the sucrose in the cane would be from 9 to 9.5 per cent, certainly not more," it makes the figures which follow rather weak. He says, much of the cane was in an unripe condition. The juice extracted was 78.07 per cent. of the cane crushed, and contained 12.11 per cent. of sucrose. Now will Mr. Alexander admit that the total amount of juice in that quality of cane is probably 85 per cent., and that the proportion of sucrose will probably be the same in the juice not extracted as in that obtained? If so, the sucrose in the cane will be 10.29 per cent. instead of 9.5.

Yours truly, W. E. ROWELL.

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## *WILL IT PAY?*

The United States Government, through its Agricultural Bureau, has for some years been experimenting with a view to manufacture sugar from sorghum, the old process of evaporation producing only syrup or molasses. The late experiments have been confined chiefly to the application of the diffusion process and the maceration of the sorghum stalks—in short, treating the sorghum and its juice by the same process that is followed in the manufacture of beet sugar. By the following extract from a late Washington paper, it would appear that the experiments have resulted in success, so far as making sugar by this process is concerned. But as it requires a very large and expensive plant to manufacture sugar from sorghum by diffusion, the important question still remains to be tested, whether it can be made to pay:

"Last year the Department of Agriculture began to experiment in a small way at Ottawa, Kansas, with the diffusion sugar-making process, as applied to sorghum cane. Instead of crushing the cane, as in the sugar-cane process, it was sawed off in minute slices, and the sucrose, or sugar-yielding sap, extracted by streams of water. The results obtained were so encouraging that the field of operations was removed to Fort Scott this year, and with a largely increased plant, experiments are now in progress on a scale of some magnitude. To-day (October 4th) a telegram was received from Prof. Wiley, Chemist of the Department, who is in charge of the works, announcing the complete success of the experiments. The telegram states that syrup has been obtained from sorghum cane of a light color, good flavor and crystalizing well. There was a complete extraction of the sucrose in six of the cells of the battery. Commissioner Collins is very much elated at the result of the experiments, and regards them as of great value from an economical point of view. In the process now had in the South there is considerable saccharine matter retained in the cane, while the experiments at Fort Scott show an absolute extraction of all the sugar."

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# SELECTIONS.

## *SUGAR BEET GROWING IN ENGLAND.*

The British Commission appointed to enquire into the depression of trade, has been publishing a series of reports which are full and interesting. The September *Sugar Cane* contains the evidence in full taken before the Commission upon the subject of sugar beet growing in England. The following extracts from the evidence will be found of interest:

(*Chairman to Mr. Martineau.*) Would you kindly give us some information about your own experience on growing sugar beet in England. Could you tell us what you consider would be the cost per acre of growing roots?—Yes; I went into the subject very carefully with an eminent agriculturist, Mr. John Algernon Clarke, of Long Sutton, in Lincolnshire, who is a very able man, and was, at one time, the editor of an agricultural paper; the question was very thoroughly gone into by him, more than I think it would be under ordinary circumstances. He has published a paper on the subject, which I have not with me, but which I could no doubt find and send to the Commission, which states exactly his estimate of the cost per acre. His estimate certainly was quite as low as any esti-

mate I have ever seen on the continent, and I think that is a very important point.

(*Mr. Lubbock.*) We have had evidence that the roots have been grown for about 9*l.* per acre, is that your experience ?—Yes, that is about it.

What is the rate that the roots would be grown per acre ?—Mr. Clarke estimated that he could grow a very much larger quantity of roots per acre in Lincolnshire, than is customary either in Germany or France. He estimated over 20 tons to the acre. He may have been too sanguine in his estimate, but I think that by the experiments which he tried he found that he was able to get about that quantity. In Germany from 12 to 14 tons is considered a very good crop. They are very small roots in Germany, no doubt, but in France from 15 to 16 tons to the acre of their large roots is considered a good crop.

Could you tell us what saccharine matter was contained in the roots which Mr. Clarke produced ?—I should certainly say that some of the roots that we analyzed contained from 14 to 15 per cent. of sugar.

They were, in fact, quite as good as the German roots ?—They were quite as good as the French roots. I would not go so far as to say that they were as good as the German, but then the German production has improved since that time.

Do you consider that the farmer would be really paid for his labor by selling his roots at 10*s.* per ton ?—Certainly.

If he sells his roots at 18*s.* per ton and grows 20 tons that would give him 18*l.* an acre ?—Yes.

And it would only cost from 8*l.* to 9*l.* to grow those roots ?—We estimate that a farmer under the most unfavorable circumstances ought to get a steady profit of 3*l.* to 4*l.* per acre, or pretty nearly that.

Is it not the case that in Germany and in all those countries the farmer, besides selling his roots, has an arrangement with the factor, under which the factor returns him something like 40 per cent. of the beetroots in pulp ?—Yes.

That pulp is sold to the farmer at a price varying from 5*s.* to 7*s.* a ton ?

It depends upon what kind of pulp it is. Diffusion pulp, I suppose, is about 5*s.* a ton.

Do you consider that a farmer would make something like a profit of 5*s.* a ton on that pulp from its value to him as a feeding medium ?—I should think very likely he could.

So that that profit, of course, would have to be added to the price that he would receive for his roots ?—Yes ; I want also to point out that the beetroot industry is an enormous advantage in this way, that it stimulates the production of cattle. The production of cattle enormously increases in all countries where the beetroot industry is flourishing.

(*Mr. Lubbock to Mr. Duncan.*) Do you distinctly confirm Mr. Martineau's figures, so far as they have gone, as to the supply of roots that can be grown to the acre ?—I think, perhaps, he has put the weight a

little too high. The weight that was got at Lavenham was about, I should think, from 12 to 15 tons an acre, but the land at Lavenham is not of very good quality; it grows a very good quality of root, but it is not a very high class land; it is rather heavy land, and rather difficult to work; I should say that from 12 to 15 tons an acre was a fair average crop.

Might I say 14 tons to the acre?—Yes, and the cost of cultivation and hauling is about 9*l.* an acre.

(*Mr. Palgrave.*) Do you include rent in that?—Yes.

(*Mr. Lubbock.*) Assuming that the farmer sold his roots at 18*s.*, that would give him 12 guineas per acre?—Yes.

The cost of growing would come out of that?—Yes.

That would leave him about 3*l.* 12*s.*?—Yes.

Do you think that we might put another 1*l.* an acre for the value of the pulp to him?—Yes, I should think you might, for the advantage of getting pulp; you might do that quite easily. I might mention this, that three tons of pressed pulp is equal to a ton of good hay, whilst six tons of diffusion pulp is equal to a ton of good hay; that is about, roughly speaking, the value of it.

That would make the value of that kind of pulp come out more than I said?—Yes, but we had to sell it at that price.

Taking this figure, and allowing only 1*l.* for the pulp, that would show a profit to the farmer of 4*l.* 10*s.* an acre?—Yes.

Do you think that any other crop grown in England on arable land would give anything like such a profit as that?—I am not aware of any at the present time.

Leaving the farmer for the moment and proceeding to the manufacturer, assuming that the manufacturer bought those roots at 18*s.* a ton, will you tell us how many tons he would employ to make a ton of sugar?—That depends upon circumstances, according to the quality of the root. The Lavenham roots contained about 12 to 13 per cent. of sugar. Those German roots now are grown, not for the quantity of sugar that they contain, but for the amount of money that they can get out of the Government. I have known one manufacturer in Silesia whose roots polarized as high as 21, but the crop was merely grown for the express purpose of getting the benefit of the bounty. He grew a very small weight per acre, about 8 to 9 tons.

I presume you would not wish to represent to the Commission that the roots in Germany, on an average, come anywhere near that?—No, I should think the average polarization of roots in Germany would be 15 now. Of course the system of duty encourages every person to aim at a small crop, but a very rich one. If you wish to produce richness you must content yourself with a small weight per acre.

Is not this the case that beyond a certain quantity of sugar obtained from the roots the manufacturer gets a profit of 10*s.* for every ton he can

produce. The Government, for instance, tax roots and pay him a drawback on the assumption that a given quantity of sugar is obtained from those roots ?—Yes, under the German system the duty is about 8½ per cent. It is calculated for the duty that the roots should produce about 8½ per cent. of sugar, although the manufacturer often gets 12, 13, or 14 per cent.

In fact, on all the sugar that he produces beyond 8½ per cent. he gets a bounty of 10*s.* a ton ?—Yes.

Going back to our English manufacturer, assuming that he has paid 18*s.* a ton for the roots, do you think we might hope, or might assume, that he can get a ton of sugar from 12 tons of roots ?—Yes, I think that can be done in England.

That would make the cost to the English manufacturer 10*l.* 16*s.* for the raw material of his sugar ?—Yes.

Do you think we might take the charge of the manufacture at 4*l.* 10*s.* a ton ?—No, the charge of the manufacture is about 8*s.* to 10*s.* a ton of the roots.

You are speaking now of Germany, are you not ?—Yes.

But in Germany they do not take 12 tons of roots to make a ton of sugar ? No.

I think in Germany they do not take much above 9 tons ?—No.

Therefore, at 10*s.* a ton, 9 tons would be about 4*l.* 10*s.*?—Yes ; but that would not make much difference, the cost would be about the same. You may say that the working expenses would be about 10*s.* per ton on the roots.

You would put it at 6*l.* to the 12 tons ?—Yes.

That would make the total gross cost 16*l.* 16*s.* per ton ?—Yes.

But out of that would come the value of the pulp and the molasses which the manufacturer sells ?—Yes.

What would you put that at ?—He should get about 3 tons of molasses, which would be worth about 5*l.* a ton, that is 15*l.*, and he ought to get about 10*l.* worth of pulp.

The two together would make about 25*l.* on a ton of sugar ?—Yes.

That is to say, that it would bring out a price of 15*l.* 11*s.* a ton, or 15*s.* 6*d.* a cwt.?—Yes, I think sugar can be grown in England for about that price.

That is raw, 2*d.* per lb.?—Yes.

(*Mr. Jamieson.*) For a crop of roots of this character a certain amount of heat is required, is it not ; the climate requires to be particularly suitable ?—No, I do not think so. I worked my manufactory in Lavenham for about five years. The difficulty there was to get the quantity of roots ; the farmers sent me in every year from 6,000 to 8,000 tons of roots. We found that in our experience that English-grown roots at the time were quite equal in quality in every respect to the roots grown in France, in Holland, and in Belgium.

Were those roots grown in Suffolk ?—Yes, entirely in Suffolk.

Would it be your opinion that roots grown in Northumberland would be equally good ?—No.

Therefore the production must be within a limited area ?—It is within a limited area in England and a limited area in Ireland, and not in Scotland at all. I have seen roots grown in every part of England, in a very large number of districts in Ireland, but in no district in Scotland. You may say that some of the midland and south-eastern counties of England are capable of growing as good roots as you can grow in any of those countries, but as you go westward the climate there is not at all suitable. I may say in a few words, the climate that is suitable for growing beetroot is this :—You require a warm wet summer, a very cool dry autumn, and a very cold winter, that is the perfection of climate for sugar beet.

That would apply to a very limited area in the United Kingdom ?—Yes, a very limited area.

The growth of beetroot in most parts of Germany, is, I think, of a comparatively recent development ?—Yes; you may say that. About the year 1871, when I first began to go a good deal into Germany, I think the crop was only about 200,000 tons, and in 1884 it was 1,200,000 tons.

The average increases vary very much in some provinces ?—Very.

I think I understood you to say that in Germany it was exceptionally good land ?—No, all kinds of land, there were some lands that produced a far better crop of beetroot than others.

But to produce a good crop of beetroot you require good land ?—Yes.

What was that land growing before it grew beetroot ?—Potatoes, rye-grass and wheat.

So that there has been a notable withdrawal of land which was growing agricultural produce of a different kind for the growth of beetroot ?—Yes. But might I interpose there and tell you this, that wherever you have the beetroot industry the other crops which follow are immensely benefitted, because the cultivation of beetroot requires to be of the very highest character, and then by the quantity of manure that it gets where so many cattle are kept, it raises the fertility of the soil to an immense extent, which you do not find in any district where beetroot is not grown.

(*Mr. Pulgrave.*) I conclude that beetroot is grown in rotation, in a four years series ?—Three years is quite sufficient.

(*Mr. Jamieson.*) So that it would not be correct to say that the growth of the beetroot had excluded the growth of wheat in those countries ?—No, I should say it rather disturbs potatoes and crops of that kind.

(*Mr. Lubbock.*) Is it the case that where the beetroot industry is carried on abroad there is evidence of considerable prosperity there as compared with neighboring districts where the beetroot is not grown ?—Certainly my experience is this, that in 1871, when I went over the northern districts of Germany, the villages were in the most destitute condition possible, and now if you go into those same districts you will find that the same villages are rebuilt and the people extremely prosperous.

I need not ask you as to whether if there was a large industry of that kind established in England it would not give an enormous amount of employment to our engineers in providing the necessary machinery ?—Certainly.

You were asked whether England would have any chance of competing with the colonies; is it not the case that the consumption of sugar in England is steadily increasing year by year ?—I am afraid I cannot say that, I think we have very nearly reached the limit of our consumption. I think for the last three years the figures that are put before us in the statistics very often (and I cannot explain them away) would tend in a different direction; but my impression is that we have nearly reached the limit of the consumption of sugar in this country.

Supposing that we were to displace foreign beet sugar, there is now, I think, 600,000 tons of bounty-fed sugar coming here, that of itself would be an enormous industry for England, and it would be some years before England could overtake that ?—Yes.

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FORESTS AND TEMPERATURE.—Professor Mutrich, of Berlin, has reached the following conclusion from his forest meteorological researches: That the forest exercises a positive influence on the temperature of the air. That the daily variations of temperature are lessened by the forest, and in summer more than winter. That the influence of the leafy forest is in summer greater than that of the pine forest, while in winter the tempering influence of the pine forests preponderates over that of the defoliated forest. An attempt to determine the influence of the forest on the mean annual temperature led to no sure results.

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THOROUGH CULTURE.—Roots of plants go deep in the soil, and require also the moisture it contains. If the soil be thin, water lying on the subsoil injures the root. In breaking up the ground if the soil be thin, the subsoil, a little at a time, should be turned up, mixing both thoroughly. The value of a soil depends on the energy with which it absorbs moisture. Those who know, say soils differ greatly in this respect. All agree that the absorbing power of soils depends on their fineness. A watery vapor always in the air is imbibed by soils in greater or less degree, depending on the condition of pulverization. When this power in the soil is energetic, the roots of the plant are supplied with water even in the absence of rains. These facts admitted, the advantage of a fine soil is obvious. Sure, abunnaht and paying crops cannot be had without a *thorough pulverization of the soil.* The whole soil should be very fine, so that rainwater with its ammonia and other fertilizing agents may find its way to the roots of plants.

# SPECIAL NOTICE.

This number closes volume five of the PLANTERS' MONTHLY, in order that the following volumes may commence and end with each year. All members of the Planters' Association and of the Hawaiian Agricultural Society, and others interested in the objects for which this publication is issued, are expected to subscribe for one or more copies of it; and each one is requested to notify the editor regarding the number of copies for which he will become responsible, and to furnish the address or addresses to which he wishes the MONTHLY mailed.

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H. M. WHITNEY,

*Editor Planters' Monthly.*

Honolulu, H. I., Dec. 15, 1886.