THE

PLANTERS' MONTHLY,

PUBLISHED BY THE

Planters' Labor and Supply Company,

OF THE HAWAIIAN ISLANDS.

VOL. III] HONOLULU, OCTOBER, 1884. [NO. 7

PLANTERS' LABOR AND SUPPLY COMPANY.

INCORPORATED MARCH, 1882

OFFICE—HONOLULU, HAWAIIAN ISLANDS.

ANNUAL MEETING IN OCTOBER OF EACH YEAR.

OFFICERS ELECTED OCTOBER 16, 1883.

Z. S. SPALDING.....President | W. O. SMITH.....Secretary
S. B. DOLE. .....Vice-President | J. B. ATHERTON.....Auditor
P. C. JONES, JR.....Treasurer

TRUSTEES ELECTED OCTOBER 16, 1883.

ATHERTON, J. B.	BAILEY. W. H.	BALDWIN, H. P.	HARTWELL, A. S.
JONES, P. C.	SMITH, W. O.	SOPER, J. H.	DOLE, S. B.
GLADE. H. F.	HALSTEAD, R.	SPALDING, Z. S.	UNNA, A.,
WILCOX, G. N.			

COMMITTEES OF THE PLANTERS' LABOR AND SUPPLY CO.

APPOINTED OCTOBER 18, 1883.

LABOR.

Jonathan Austin, W. O. Smith, G. N. Wilcox, J. M. Horner, James Woods.

CULTIVATION.

Geo. C. Williams, Wm. Lydgate, A. H. Smith, Chas. Notley, J. H. Soper.

MACHINERY.

Wm. E. Rowell, W. H. Rickard, R. R. Hinds, Jas. Renton, H. F. Glade.

LEGISLATION.

W. R. Castle, W. W. Hall, J. H. Paty, J. B. Atherton, P. C. Jones, Jr.

RECIPROCITY.

E. P. Adams, F. A. Schaefer, H. M. Whitney, H. P. Baldwin, H. W. Mist.

TRANSPORTATION.

H. P. Baldwin, S. L. Austin, Z. S. Spalding, C. F. Hart, H. Turton.

MANUFACTURE OF SUGAR.

R. A. Macfie, Jr., A. Hanneberg, C. Koelling, H. P. Baldwin, E. C. Bond.

LIVE STOCK.

W. H. Bailey, J. L. Richardson, J. N. Wright, W. H. Cornwell, B. F. Dillingham.

FORESTRY.

C. R. Bishop, W. H. Purvis, C. F. Hart, E. Bailey, J. K. Smith,
Chas. Notley, R. Halstead, S. B. Dole.

FERTILIZERS AND SEED CANE.

G. N. Wilcox, G. H. Dole, R. Halstead, T. J. Hayselden, S. L. Austin.

VARIETIES OF CANE.

T. H. Davies, C. S. Kinnersley, A. Unna, A. S. Wilcox, W. H. Bailey.

STATISTICS.

W. O. Smith, P. C. Jones, Jr., T. H. Davies, C. M. Cooke, H. F. Glade, J. B. Atherton.

EDITORIAL AND GENERAL.

THE ANNUAL MEETING

Of the Planters' Labor and Supply Company will be held in Honolulu on October 20th.

We would especially call the attention of the various members of the committees, whose names can be found on the first page, to the importance of taking time in making up their reports that they may be as full and valuable as possible. Although the chairman of each committee has a greater degree of responsibility for the report, each member should make it his business to collect material from which the report will be compiled.

We hope to see the meeting largely attended, as there are many questions of importance which should be considered carefully by those who are most interested in the prosperity of the country—the planters.

———o———

A DIFFUSION PLANT FOR HAWAII.

The subject of extracting sugars from cane by the diffusion process is attracting the attention of the sugar world. At a recent meeting of the planters of Java the subject was discussed, and it was resolved to obtain a plant for the purpose of testing the efficiency of the process. Arrangements have been completed with German manufacturers whereby they agree to furnish a complete plant, which, if the trial proves unsatisfactory, they will take back, charging only for breakage and the decrease in value from wear and tear, and return freight and insurance.

The experiments will comprise two more or less distinct parts, the cutting of the cane by means of two machines of different models, besides the outfit for the extraction and the working of the juice. The total expenditures, according to the estimates, will be 74,935 florins (about $30,000), including the salaries and traveling expenses of a mechanic to work with the cutting machines and two others for the management of the diffusion apparatus.

In Louisiana diffusion has been successfully tried with cane, although the results are not yet as satisfactory as could be wished. The last Congress voted $50,000 for use in developing improvements in the sugar industry, a large part of which will be used in erecting a complete diffusion plant to demonstrate its capabilities.

Hon. H. A. Widemann, of this city, was not long since in Germany, and made himself acquainted with the working of the process there. He is sanguine of its success if applied to cane, and has obtained figures as to the cost of a plant. Messrs. Schaeffer & Budenburg, a German firm, quote to him as the cost in Germany of a ten ton plant, to include a cutting machine and all accessories, at about $8,000. Mr. Kruger of Kauai, in his

communication of last month, estimates the total cost of a plant delivered here at not more than $10,000. Mr. Widemann considers that the Java estimate is extravagantly large. He has opened a subscription list for the purpose of introducing a plant, the cost to be borne *pro rata*, according to the tonnage of the different plantations, if the planters will agree thereto. His proposition is to locate the plant at some convenient plantation on Oahu, where it can be easily examined by all. In case the experiment is a success the plantation to buy the plant. If it is a failure, the loss to fall on all.

We recommend this subject to the earnest consideration of all planters, that it may be intelligently discussed at the coming meeting.

———o———

THE SUGAR FUTURE OF THE ISLANDS.

The present is a critical period to all sugar growing countries, particularly to cane growers. The enormous increase in the manufacture of beet root sugar has so increased the supply that it is far in excess of the demand, and as a necessary result, prices have declined to such an extent as to threaten the existence of the sugar industry in many places. Under these circumstances sugar producing will survive only in those countries where cultivation and manufacture are conducted upon the most advanced principles and by the most economical methods. It will be a case of the survival of the fittest, and those who adhere to primitive methods, or even to any methods inferior to the best, will either be forced out of the market or will struggle along in a hand to mouth fashion, constantly on the verge of bankruptcy. Already Cuba, which has been one of the largest producers of cane sugar, is in a state of absolute bankruptcy. Plantation after plantation has been abandoned, and there is scarcely a plantation in the island which has not wound up the season with a heavy loss.

Although sugar cane contains a much greater proportion of sugar than an equal quantity of beets, the countries which are taking the lead in the manufacture of sugar, are exclusively beet sugar countries. Beet sugar manufactories in Germany have paid during the last year, 35, 50, and even as high as 65 per cent. on the invested capital. The General Government indeed fosters the sugar industry, and pays a bounty upon sugar exported, but although the bounty paid adds to the profits, profits exclusive of the bounty are large. The question for us, and all cane planters to consider is, why is it that Germany can produce sugar from an inferior material, and make a handsome profit, whereas the majority of cane producing countries are either manufacturing sugar at an actual loss, or are struggling against close competition and making a margin of profit barely sufficient for living expenses. It is not that Germany has cheap labor. Although the price of labor varies greatly, the average wages for laborers in the sugar districts, are from 65 to 85 cents a day. It is not that they have any better market than we do. In fact we get a little better price.

The sole and only reason is that they have constantly and continually kept improving and perfecting their processes, until they have the best sugar machinery in the world. Scientific men by the score have devoted their whole time to studying out and devising means for obtaining the greatest proportion of sugar from a given quantity of material. For twenty-five years the beet sugar industry struggled for an existence, and was kept alive almost solely by means of the Government bounty. Gradually however, experience was gained, and improved methods were introduced whereby a larger proportion of sugar was extracted. In 1871, out of 311 sugar manufactories, 216 or 69.5 per cent. extracted juice by means of presses, while 52 or 16.7 per cent. used the diffusion process. In 1878–9, however, out of 324 manufactories, only 50 or 15 per cent. used the press, and 258 or 80 per cent. used the diffusion process; and at the present time almost all German sugar is produced by diffusion. The lesson to be drawn is this: If we are to continue to produce sugar at a profit, we must either produce a given amount of sugar at less cost, or we must produce more sugar from a given amount of material than we now do. There is no immediate prospect of our being able to get labor at a much cheaper rate than at present, and the necessary plantation supplies will continue to cost about the same as they now do.

Although expenses can be reduced on many of our plantations, the fact still remains that the amount of sugar produced on many of our plantations does not pay for the cost of producing it, or at least barely pays the cost, at the present price of sugar, and there is no prospect of a material increase in the price. Our only resource then, is to adopt machinery and processes which will extract a larger proportion of sugar from a given amount of cane, than the machinery and process which we now employ will do. Experience has shown that diffusion will extract a much greater percentage of sugar than pressure, and wisdom would suggest that we make some effort to ascertain the feasability of introducing the process here.

———o———

THE EUROPEAN BOUNTY SYSTEM.

The payment by European countries of bounties on exported sugar has to a great extent stimulated and caused the present over-production of sugar. Germany has paid the highest bounty and has therefore been able to successfully compete in all markets, even exporting to England and France, and underselling the refineries there. The distress in France among the sugar producers became so great that the French Legislature has lately changed the system of sugar taxation and bounties upon exported sugar, to correspond to that of Germany. In England, many refineries have shut down, and those which are running are making no profit. Immense meetings have been held in London, by those interested in

sugar, to devise ways and means of abolishing the continental bounty system, which makes competition impossible. Two methods of dealing with the subject are suggested. One is that diplomatic representations be made to the Continental Governments with a view to inducing them to abandon the bounty system. The other course is to impose upon all bounty sugars a duty equal to the amount of the bounty. The latter course however savors so strongly of protection that it is not likely that free trade England will ever consent thereto. The former course may have some effect, but cannot be relied upon. A committee has been appointed in England to visit the continent and report upon the working of the system.

The system is not without opponents in the countries where it is in practice. A strong attempt was made at the last session of the German Reichstag to reduce the bounty, but the sugar interest was too strong, and the reduction failed. The system of taxing the general public, that a particular industry may pay an exorbitant profit is however, one that cannot last long, especially as the prime reason for the bounty, which was that sugar could not be profitably produced without it, no longer exists. It is only a question of time when the general good of the nation will require the abolition of all bounties.

———o———

SUGAR PRODUCTION IN AUSTRALIA.

At a recent meeting of the Maryborough Farmers' and Planters' Association, the chairman made the following statements concerning the sugar prospects, speaking more particularly of the Wide Bay district:

"I regret that owing to the difficulty of procuring a regular supply of suitable labor, the future of the sugar industry is not so cheering as it was at this time last year. Each year during the last four, the supply of kanaka labor has been more and more limited and expensive. The seasons, also, during that period, have not been so favorable for agriculture as those that usually prevail in the Wide Bay country. The present crop, owing to the late drought, is very backward, and unless the rest of the winter continues mild the output for the next crushing will be far below the usual average. The average yield per acre for each of the last four years was as follows:

Year 1880–1	23¼ cwt.
" 1881–2	18½ cwt.
" 1882–3	12 cwt.
" 1883–4	25 cwt. nearly.

This gives an average for the four years of 19¾ cwt.

The yield for 1883–4 is spoken of as being "most satisfactory and encouraging." A ton and a quarter to the acre would hardly be considered "most satisfactory and encouraging" on these Islands. All of the raw sugar was sold in the local market at an average price of £22 per ton, and molasses at one penny a gallon. In view of the yield and price, we can well believe that the following statment made in the course of the chairman's remarks, is true:

"After all that can be said in favor of the sugar industry, my experience is that sugar in this latitude costs as much in its production as it is worth in the market, taking one year with another, and allowing a fair percentage on the capital invested.

"The people engaged in it must stick to it, because they cannot afford to lose the money invested in machinery and other appliances. There is an opinion entertained by some people that sugar planters are rolling in wealth. If those who think so would only take the trouble to look at the case in its true bearing, they would be quickly undeceived."

This is to a certain extent applicable here. While some plantations with good lands and maceinery are paying dividends, a large number are doing nothing more than keeping their heads above water.

———o———

LOUISIANA SUGAR CROP OUTLOCK FOR 1884.

We greatly fear, says *The Sugar Bowl*, that this season will be one of general short crops for Louisiana.

A series of misfortunes have visited planters, including nearly all crops.

It is well known that the sugar crop, owing to the partial failure of the ratoons, will fall considerably short of that of last year, at best—at least 25 per cent., including the loss by floods. If the drought continues, as it does at present writing in most sections, it will be even *more* than 25 per cent. short. Sugar planters all feel more despondent than ever before, for it has been so difficult to obtain means to make this crop, that unless there is an improvement in the price of their product, many will this fall grind up all their cane and either turn their plantations over to commission merchants, and go to stock-raising or general farming.

———o———

HARD TIMES FOR SUGAR PLANTERS. THE REMEDY.

The condition of the European sugar market is having an uneasy influence on the Australian industry, and is calculated to cause much anxiety as to the future. The market has been placed upside down by the unlegislative bounty system of the Continent, a system that cannot last. The only way for cane-sugar planters to hold their own for the next two years is by employing cheap labor, first-class culture, economical machinery, and the adoption of the best chemical process. The colonial sugar planter has despised the agricultural chemist, the inventive engineer, and technical journals too long. Growers and manufacturers must do as they did in Germany, viz., apply science and economy to practical field and factory operations.—*Australian Tropical Planter.*

———o———

THE STANDARD SUGAR REFINERY at Alvarado, California, commenced work on the present crop of beets on August 20th. A number of improvements have been made, which will increase production and lessen cost. The present crop of beets will be from 16,000 to 20,000 tons, as against 10,000 to 12,000 tons in former years.

THE PROTECTIVE CONVENTION IN LOUISIANA.

The following from the *Sugar Bowl* shows a decided change of sentiment in the "solid South," and that the dividing line in politics in the near future will be protection and free trade:

"We observe that the course of the Convention of the 20th, in which sugar planters were in the majority, has been severely criticised by many.

"Because they would not allow either one or the other of the leading political parties to capture the Convention and direct its deliberations, both factions now condemn.

"We, on the contrary, think it has begun a *great work.* It condemned and approved public men according to their acts in Congress, entirely regardless of party. Such *independence* is indeed a most encouraging feature for Louisiana. It passed strong resolutions, with a most remarkable unanimity. To favor '*protection as a principle,*" has the ring of earnestness about it, and we think they should have gone a step farther and recommended all its members to vote for those who they consider most likely to favor protective legislation for all great American industries. This was not *necessary,* except to show the world the attitude of Louisiana planters, for *all* are going, henceforth, to be *independent* of parties, and vote as they consider *best for their material interests.* The politicians have completely lost their control of the hitherto too confiding agriculturist, and hereafter *no rings* will receive their support.

"Thus, the convention of the 20th has been a most important factor in the mannfactare of a healthy *public opinion,* and the nervousness of the ring-masters plainly shows that they see the 'handwriting on the wall.'"

———o———

A LIFE AND DEATH STRUGGLE.

It is a peculiarity of the human race that it can take some comfort from the misfortunes of others. This being so, it follows that Hawaiian planters, though suffering very greatly from the depression in the sugar industry, can take to themselves some comfort in the knowledge that their case is not nearly as bad as that of many West Indian planters. Cuba is nearly bankrupt, and Barbadoes gives vent to an exceeding bitter cry. The *Agricultural Gazette* of that island, speaks as follows:

"There is nothing in this world more dreadful to hear than the agonizing shriek of a fellow creature hopelessly drowning—nothing more sad than the cry of a people hopelessly struggling in the waters of sudden adversity. Never in the history of the West Indian Islands—never in the history of this island of Barbadoes, did such a tidal-wave of calamity threaten to sweep us commercially from off the face of the earth. Through no fault of ours, through no lack of industry on our part, or incapacity to make the most of the advantages with which Providence has blessed us, has this calamity befallen us; but simply because the immense production of sugar all the world over, has brought our staple to a figure at which, *on the present lines,* it is impossible for us to continue its profitable production. The consequences of commercial extinction to this Island, with its dense population, are too enormous to contemplate, and it is on behalf of our struggling country, which unless some of its bonds are loosened, or some of its burdens lightened, must speedily be overwhelmed; and, further, with the single aim of endeavoring to show how some of these evil consequences

may, in part, be averted, and some of these burdens lightened, that we feel it our duty to point out the following anomalies, and to appeal to the good sense of those who, having shared our prosperity, should in the day of our poverty be willing not only to relax their hold upon us, but generously to help us."

It then goes on to appeal to its bankers and merchants; the first to lower the rates of interest on loans, which stood up to the present time at 6 per cent. Freights and charges are discussed and plans proposed for lowering them, and also the cost of manures. Certainly, however bad the condition of the Hawaiian planter may be, he is in no such straits as this. He is at the present moment in no actual danger of extinction.

There is however a life and death struggle going on between the rival producers of sugar, and in both the markets of the old and new world they may be said to be face to face. The beet-root manufacturers of Europe have taken science as their ally, and by means of chemistry have more than doubled the yield of beets. The beet-root industry is making strides in the United States. We here in Hawaii have little to fear from Europe, but the cane planters of the new world have a formidable rival in the manufacture of beet-root sugar in the States.

The only chance for the cane planter is to produce his sugar at such a reduced cost that he can undersell his beet-root rival. Sugar-cane in its cells contains twice the saccharine matter that beet does. Beet-root only produces one ton of sugar to the acre; the average yield for sugar cane on these Islands is three tons to the acre. Economy in management, reduction in the cost of labor, and obtaining the entire amount of saccharine matter from the canes, are what our planters and mill-owners ought to aim at. The days of happy-go-lucky management have long been things of the past, but so much capital is now invested in sugar in these Islands that nothing but the very best agricultural skill in supervising the fields, and the best of mechanical skill in running the machinery, will obtain the results required.

Above all, our planters should give attention to the new processes for expressing juice as they are brought forward, and we would call especial attention to the diffusion process, which has been pretty thoroughly discussed in these pages. We have a hard row to hoe, but only give us a good hoe and we will be able to do as well if not better than our neighbors.

———o———

—Mr. William Goodale, formerly sugar boiler at Pahala, and more recently at Paia, Maui, has taken charge of the planting department on the Wailuku Plantation. The latter plantation has given up the system of letting its lands out to planters on shares, and with the exception of one contract unexpired, is now doing all its own planting. Mr. H. M. Alexander will take Mr. Goodale's place as sugar boiler at Paia.

THE LABOR SUPPLY IN MAURITIUS AND AUSTRALIA.

This question is always prominent in sugar-growing countries. The situation in Mauritius is thus described in the Queensland *Planter and Farmer*:

"The reports from Mauritius as to the condition and prospects of the planters continue to be of a depressing character. The *Mercantile Record* asserts that unless there arrive large supplies of engaged hands, the day laborers will continue to be masters of the situation and demand and obtain fabulous prices for their slovenly work. The only hope it sees is in the fact that the Governor has promised to introduce a change in certain articles of the labor law at the commencement of next session. It is therefore to be hoped that help for the planters is not far off."

The sugar industry in Australia is likewise suffering greatly from want of labor. The planters there depend almost entirely upon laborers from the South Pacific Islands, and owing to a hue and cry against cheap labor similar to the anti-Chinese cry in California, a law has recently been passed in the Colonial Legislature restricting this supply, under such conditions as to practically cut it off altogether. The *Planter and Farmer* thus speaks of the effect of this policy:

"Speaking of capital we learn that the sugar industry in the North is at a stand-still for want of it. The banks have quite given up making advances on even the best property of this class, having determined not to invest one penny more before the labor question is settled on a permanent basis. We heard of the case of a business man at Mackay, who has property worth some £5,000, who was refused by the bank with which he has dealt for many years, an over-draft of £300—the instructions being imperative, to make no further advances. The effect this policy is having in the northern sugar districts is most disastrous. Business is at a standstill, no fresh land is being cultivated, and everyone is discharging all the hands that can be spared."

In another place the same journal says: "The sugar industry is now threatened with political opposition through a number of demagogues, who, knowing the prejudices of the white against colored laborers, appealed to their prejudices in order to get their votes."

———o———

NEW INDUSTRIES.

The following correspondence in the *Australian Sugar Planter*, with reference to new industries which are being commenced in Australia, is worthy of emulation here. Speaking of a new coffee plantation, the writer says:

"The company of which Mr. Poett is resident manager and a large shareholder, has purchased 3,000 acres from the South Australian Government, about 35 miles from the seaboard south of Port Darwin, immediately on the line of railway shortly to be constructed from Port Darwin to Pine Creek. The greater portion of the land is chocolate soil and is admirably adapted to the successful cultivation of both coffee and cinchona. He has a nursery about three acres in extent, every inch of which has been carefully prepared. About ten or fifteen Chinese are employed, the only labor he can at present command, and which he considers is very inferior and expensive, the average wages being 20s. per week, they find-

ing themselves, but the plantation bearing the cost of cartage of the rations, which at this season of the year costs about £20 per ton, and in the dry season the rate is not much under £10 per ton. The plantation has been established about two years. The first year's labor was chiefly taken up in fencing, clearing, homestead building, &c., so that the planting of the seed only commenced within the last twelve months. Despite the constant care and the exceptional dry season we passed through last year, the young seedlings were thrown back considerably. At Christmas the general rains had not set in, and Mr. Poett could not commence transplanting from the nursery where the plants were outgrowing their framed confinement, into the larger area he had prepared for their reception. The rains have since set in in time, and I quote from his last letter. He says: 'Since you were here I have planted out several thousands of cinchona, coffee, and Indiarubber plants of the Ceara variety, and all promise to do well. The growth of the Indiarubber is simply grand, germinated *seed* planted out on 18th September, 1883, are now shapely young trees ten feet high.'"

———o———

FRUIT CANNING IN CALIFORNIA.

The fruit production of California is constantly increasing. The following description of a canning factory, from the *Australian Planter and Farmer*, gives a good idea of the science to which fruit canning has been reduced:

"The Cutting Canning Factory in San Francisco, whose system of working may be taken as illustrative of all the others, is a ground-tier building, covering an area of 2 acres, the utmost cleanliness being secured by the floor being asphalted and sloped in various directions into channels, so as to admit of frequent flushing with water, an ample supply of which for all the purposes of the establishment is obtained from an artesian well sunk in the centre of the establishment. The ruling speciality of the establishment is the use of labor-saving machinery. The only department in which machinery is found not capable of being introduced is in the sorting of the fruit, and this, which is an important part of the work, is done by women, who are paid at the rate of 1 to 1½ dollars per day. In every other direction the manner in which machinery is made to do the work of the human hand is something marvelous. The machinery for can making is almost automatic; a dozen hands stationed at various points, engaged in feeding the mechanical wonder with sheets of tin, being all that are necessary for the construction of 50,000 cans per day. The machinery occupies a large portion of the end of the building, and is arranged on the continuous principal of the hog killing machinery at Chicago. The sheets of tin are fed in at one end, proceed from the process of "body cutting" to "crimping," thence to fitting and soldering, until they come out at the other as fast as an attendant can remove them in the shape of perfectly finished cans ready to be filled.

"As the fruit is received in cases from the producers it is weighed on a large platform scale and passed along to the sorters, who sit at long tables, rapidly classifying it into three grades according to its size and quality, at the same time picking off all stems and leaves. From the sorters the fruit goes on to be placed in cans, a work that is also done by women, whose wages range from 1⅛ to 1¾ dollars per day, and thence it passes to the fillers, another set of women employees, who fill the cans at

taps leading from a large overhead tank containing the syrup. After the cans are filled the soldering on of the covers is done at the rate of 60 cans an hour, the astonishing ingenuity of the machinery being here again displayed. Labor-saving machinery at every point, and labor-saving appliances, in the shape of tramways and lifts, all over the building, to do the work of shifting the fruit and cans about to the various departments with as little handling as possible. Wages are high, and the system in every direction is found to comprise the employment of experts who are thoroughly perfect in their business, which is mainly a superintendence of the work done by the machinery.

"From the soldering department a tramway conveys the cans in large trays, holding 100 each, two large cauldrons of boiling water fitted with cranes which hook on to the laden trays, lift them from the trollies and submerge them in the boilers. The time required for this process varies, and is determined by an attendant whose special knowledge is understood to be of the most valuable kind, and only obtainable by experience, backed by considerable judgment. When this expert gives the word the trays are swung up out of the water, and an attendant stabs each can on the top with a bradawl, in order that all air may be driven out; when a touch of solder is rapidly applied to the holes; the trays are again submerged, and when lifted out the second time, set upon a trolly and run off to hands engaged in labelling and packing the cases. Before the work of casing takes place, however, each can passes through the hands of an experienced employee, called the tester, whose ability to detect one not likely to keep seems to have been developed to a very fine point, a glance at certain indications in the appearance of the cover accompanied by a tap on the tin being sufficient to enable him to determine instantaneously whether to pass it on as all right or to throw it out as imperfect.

When the factory is in full work it turns out between 40,000 and 50,000 cans a day with 200 hands, whose wages strike an average all round of 2 dollars a day. For this quantity of work about 500 lbs. of fine sugar is used daily in the manufacture of the syrup, and it sounds strange to hear that the soldering material all comes from Australia, the Cutting factory receiving as its own share 200 pigs of tin by each of the Pacific steamers that run between Sydney and San Francisco once a month."

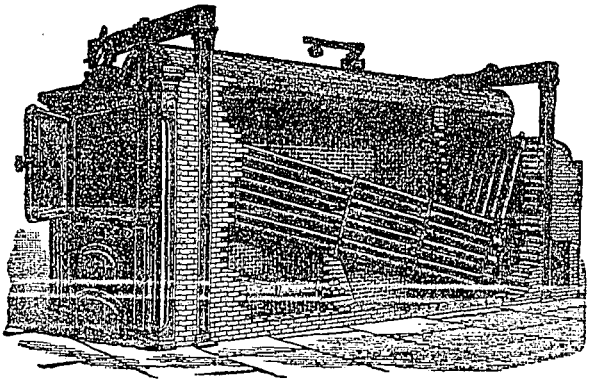
———o———

THE PURCHASE OF CUBA BY THE UNITED STATES.

The story is going the rounds in the papers, that Cuba is to be purchased by the United States. Another version is, that a syndicate consisting of August Belmont, P. Lorillard, Stanford, J. G. Bennett, and others, has been formed to purchase the island for $100,000,000, with the intention of eventually ceding it to the United States. The President and Secretary Chandler are said to favor the scheme. It is not probable that anything of the kind will be done, as the policy of the United States is opposed to the acquisition of foreign territory. The Louisiana *Sugar Bowl*, however, seems to give credence to the story, and says, "we fear Cuba will yet become a part of the United States." If the scheme is accomplished, it will bear serious consequences to us, as it will give to a vast sugar producing area the same advantage which we now have, of sending sugar to the United States free of duty, thereby greatly stimulating the industry, and causing the inevitable decrease in price which succeeds over production.

COMMUNICATIONS.

THE BABCOCK & WILCOX WATER TUBE BOILER.



The prospect of the continuance of the low price of sugar for some time, makes more interesting to sugar-makers any improvement in machinery which promises to cheapen the cost of manufacture by economizing either labor or fuel. In a number of mills the introduction of double effects has reduced the consumption of fuel so that none is used besides the trash. Improved furnaces burn the trash direct from the rolls, so that the labor of handling and expense of trash-houses are avoided. Yet there are still many mills where fuel purchased is an important item, and to the owners of such is recommended the consideration of certain important advantages that are presented in the Babcock & Wilcox boiler whereby the greatest efficiency in steam production is attained. The boiler may be briefly described as a series of tubes, connected at the ends, and set at an incline of about 15 degrees with the horizon. A horizontal steam drum is placed over the tubes, each end connected with the corresponding end of the tubes. Brick walls on either side meet the sides of the steam drum, the bottom of which is exposed to the hot gases in the chamber. When filled, the water line is about the middle of the steam drum, the lower half of the drum and all of the tubes with the connections are entirely full of water. The furnace is under the most elevated portion of the tubes, and the water in that part becomes the hotest. This causes it to rise, and it flows up the tubes into the steam drum, being replaced by the colder water from the lower end of the tubes, and this again by water from the back end of the steam drum, where the feed pipe is inserted. Thus a constant circulation is kept up, and the conditions secured whereby the heat is taken out of the gases most rapidly. The steam is liberated from the water when it enters the steam drum, and the water then returns through the tubes to take up a new supply of heat.

Another important advantage of this boiler is the thorough contact of the hot gases with the tubes. The burning gases do not pass lengthwise with the tubes but across them, and they are so arranged that there is no straight passage between them, each tube in one row being directly opposite the opening between two tubes in the next row. By means of flame

plates and a hanging wall the draft passes three times across the whole set of tubes, so that it is hardly possible for any particle of hot gas to reach the chimney without having impinged against the heating surfaces many times. It is obvious that the case is quite different with the ordinary tubular boilers, for in passing straight through a tube there may be a considerable portion of gas which does not come in contact with the iron at all. This was demonstrated in the Babcock & Wilcox boiler which has been erected at Hana for the Reciprocity Sugar Co. Repeated Pyrometer tests of the gases entering the smoke-stack showed a heat never higher than 600° Fh., while the same tests in the flues of a tubular and flue boiler which were being used at the same time, showed at times a heat of 1000° or 1200°. This was plainly so great a waste of heat that the engineer has been compelled to largely reduce the grate surface under those boilers. This Babcock & Wilcox boiler has a capacity equal to that of an ordinary pair of compound boilers, and has 35 square feet of grate surface.

Another advantage which will be apparent at once, is the thinness of the metal which can be used in tubes as compared with the thickness of the shell of an ordinary boiler, presenting much less resistance to the transmission of heat.

Where there is any liability to scale, there is an important advantage in the ease with which these tubes can be cleaned. A cap at each end of each tube can be removed, and all scale thoroughly taken off with the scraper, while the soot which deposits on the outside of the tube can be swept off; or even when the boiler is in operation, blown off by means of steam hose. It may be noticed here that in an ordinay tubular boiler it is possible for soot or ashes to deposit until two-thirds of the surface of a tube is covered, while it is impossible to pile a deposit on the outside of a tube so as to cover more than one-third of the surface.

Even were there no other advantage, the easy transportation of a boiler which is made in sections would be an object in most locations in these Islands, and with all the advantages of efficiency and economy a Babcock & Wilcox boiler can be furnished at a less cost than any boiler of equal capacity on the Islands.

Thorough tests have established their superiority, which has been recognized in the United States, England, Europe, Cuba, and other parts of the world. Nearly all of the Eastern sugar refineries have replaced their boilers with the Babcock & Wilcox. They have been in use for twenty years, and of all that have been erected 95 per cent. are still in use, which is sufficient proof of durability. W. E. ROWELL.

—Mr. John Durham has been sent out by the Jarvis Furnace Company, and will herefter assist Capt. Robbins in putting in new furnaces of this pattern. The Company have three new furnaces in process of construction upon as many plantations.

THE LIHUE FOREST RESERVATION.

The proprietors of the Lihue Plantation on the Island of Kauai, have for some years had an experienced German forester, with several men under him, engaged in planting and cultivating trees on the eastern slope of the crater of Kilohana, and but a mile or two mauka of the plantation cane-fields. This slope was formerly covered with a growth of trees, mostly Koa, but has long since been cleared of all trees for firewood, with the exception of a few trees remaining in the valleys. A few months ago, I visited the reservation and found that between fifty and a hundred acres had been planted with trees. The ground slopes in broad low ridges toward the sea with small shallow intervening valleys. The soil on the ridges is poor, while that in the valleys is comparatively rich. The trees are planted in rows three or four feet apart, and the trees are about the same distance apart in the rows. The greater part of the area under cultivation is planted with Pride-of-India trees, besides which there is a small patch of the Tahitian Kamani, and a considerable number of Koa trees. At the time I visited the place, several acres of new land were being planted with that variety of the Acacia which resembles the Monkey-pod, but bears dry rattling pods. A considerable area had also been recently planted with Algeroba seeds, and a few exotic trees received, if I mistake not, from the Government nursery under Mr. Jaeger's care, were being planted at the time of my visit. The Pride-of-India trees which were growing on the ridges looked poorly on the whole, though many of them had reached a height of fifteen or twenty feet; those in the valleys were much more luxuriant and had apparently grown rapidly. The Kamani trees were in a sheltered place in one of the valleys and looked well. The Acacia trees appeared to be making a good start. The Koa trees generally were doing well—those in the valleys being very thrifty. On the newly prepared land where the planting of Acacia trees was going on, numerous Koa trees had started, probably from seeds left in the ground from the former forest, and were growing rapidly.

From my observations, I should regard that part of the reservation devoted to Pride-of-India trees as a failure. These trees are inferior as timber and are unsuitable for situations exposed to the trade-winds. In sheltered places they grow well enough, but there are so many other kinds of trees which are immensely superior to them in every way, that are available for cultivation, that it hardly seems worth while to spend time and money on them. The Tahitian Kamani, being a valuable and handsome hard wood, suitable for furniture and mechanical purposes. is doubtless a desirable tree for cultivation, especially as it is hardy and grows well in many localities. It is doubtful if the Algeroba will succeed in the locality referred to, but there is every reason to believe that the variety of the Monkey-pod already planted will do well, and also that the common

variety would also succeed. The cultivation of Koa trees on this reservation is very encouraging and proves that this valuable timber tree can be cultivated to advantage in suitable localities. It is probable that some of the varieties of the Australian Gum tree would thrive on this reservation.

In regard to the manner of planting, it is a question whether it is worth while to plant trees of any kind, in these Islands, so close together as three or four feet. In some countries, where young saplings are in demand for poles or the manufacture of hoops, such a system of planting may be profitable, but here, saplings have no value, and such close planting for a permanent growth would seem to be detrimental to the proper development of the forest, as the surplus plants rob the soil of the nutriment needed by the rest, and if left to themselves are after a while in the way of the others. As far as the cultivation of a forest is concerned, all such surplus plants might properly be classed as weeds. The condition of this Lihue forest bears out this view, as many of the trees have a spindling and starved appearance, as if they were overcrowded. The advantage of close planting, which is to shade the ground as early as possible thereby preventing the growth of weeds and grass, could be obtained by planting the trees much further apart, say from nine to fifteen feet, which would materially diminish the expense of cultivation on the same area.

This enterprise is an experiment in the right direction, and is worth all it has cost to the proprietors, and is a valuable addition to the general fund of information on the important subject of forestry in these Islands.

S. B. DOLE.

THE KOLA NUT (STERCULIA ACUMINATA).

About 30 lbs. of Kola nuts for planting were sent by the U. S. Consul of Sierra Leone to F. B. Hastings, Esq., of Ulupalakua, who has kindly placed them into my charge. Considering the long journey and the apparently perishable nature of these nuts, they arrived here in a very fair condition, and as they were put into the ground immediately after receipt, it may reasonably be expected that they will grow.

The Kola is indigenious to the tropical Western Africa, but in India, Ceylon, and the West Indies, it is now being successfully cultivated, and the trade in this nut is rapidly increasing.

Their commercial value is said to be from $400 to $500 per ton.

The stimulative qualities of this nut, without being intoxicating, are praised by all; it is said to enhance the flavor of anything eaten after it and to allay the pangs of hunger.

It is stated by many African travelers, that the negroes there can endure the fatigue of traveling on foot for days, even whilst carrying heavy burdens, with no other food to subsist on but a few Kola nuts.

Whatever benefits may arise from the introduction of these nuts into this country, remains to be seen, but as to the value placed upon them by the aborigines in Africa, the following may be illustrative.

The acceptance of a Kola nut or only a part of one, offered by the host, secures hospitality in its broadest sense to the traveler, the stranger, and even the enemy; but the nut not being offered, or being rejected, is at onee a token for strife unto death.

If quarrels arise between two different tribes, two red Kola nuts and a white one halved are placed upon a neutral hill, if the white is taken, peace is restored at once, but if a red one is chosen, hostilities continue.

The most precious gift loses its value without being accompanied by some Kola nuts.

The account which Mr. Christy gives of the Kola nut and its uses, seems in some instances to be a little extravagant. A. JAEGER.

Honolulu, September 23, 1884.

MR. CHRISTY'S ACCOUNT OF THE KOLA NUT (REPRINTED FROM THE TROPICAL AGRICULTURIST).

I introduced the Kola nut into England about eight years since, and it has lately been subjected to European analysis, and the results obtained make it exceedlingly likely that a large European demand will soon exist.

It has been found to contain the same active principle, viz., caffeine, and more of it than the best coffee, and to contain also the same active principle as cocoa, but less fatty matter.

Possessing the same qualities as these favorite beverages, it only needs proper treatment to develope a special flavor, and it would then probably be able to compete successfully with those beverages. The nuts are used to form a refreshing and invigorating drink throughout a large portion of tropical Africa, their use being said to support the strength, allay inordinate appetite, assuage thirst, and promote digestion, and to render those using them capable of prolonged fatigue.

The negroes prefer them to tea or coffee, and when they can obtain kola nuts, will not touch coffee. Dr. Daniell says of them: "It would be difficult to find any product which constitutes such an important article of commerce in Soudan as the Kola nut."

Wherever the negro has been transplanted to a foreign country, he has taken the Kola nut with him. As a medium of exchange for the products of Central Africa, no article could be more advantageous, and on this account alone the tree will well pay cultivation.

Moreover, if once introduced as a beverage in civilized countries, the demand for it would soon become enormous.

I have recently been informed by Mr. Espeut, a well-known sugar planter of Jamaica, that the negroes use the Kola nut as a remedy for drunkenness; that swallowing a single nut ground up and made into a cream or paste with water or spirit, no sign of intoxication remains half-

an-hour afterwards. Confirmatory evidence of this property in the Kola nut is given by a surgeon, Mr. Papafio, who tells me that alcoholic drinks do not produce intoxicating effects when the Kola nut is eaten at the same time.

It appears therefore, that the craving for drink, which is such a strong incentive to drunkenness, may be subdued by the use of this valuable stimulant and tonic, as after chewing the Kola nut great disinclination is felt to all forms of alcohol.

It has also been found to possess a beneficial action on the liver, its continual use preventing attacks of despondency. Dr. Daniell records a case of this kind in which the Kola nut put a stop to an epidemic of suicidal mania, which threatened at one time to depopulate the estate on which it occurred. It is also used by the natives when in a low state of health, suffering from the skin cracking and peeling on the hand and feet.

—Mr. W. O. Smith, in company with his cousin W. E. Smith, of Koloa, Kauai, is taking a trip to Southern California, with the intention of obtaining information concerning the fruit-growing districts. He will return in time to be present at the meeting of the Planters.

—The Wailuku Plantation has been using a Baker & Hamilton single Gang Sulky Plow for cross plowing, which in the stiffest soil has averaged 1⅓ acres per day with one man and five mules, leaving the soil in a finely pulverized condition, and leaving no unbroken pieces of land, such as are left by wheelless plows. This is more than two ox teams of eight oxen and three men each coould accomplish in the same time.

—Since putting in double gearing and double effect during the past season, the Wailuku Plantation has ground an average of 38 clarifiers per day of 10½ hours actual grinding time, one day making 42 clarifiers. The clarifiers are of 600 American gallons each, and the mill has a grinding surface of 51 inches length by 26 inches in diameter. This has been done on trash alone, the surplus of which has filled two trash-houses of 140 feet in length by 25 feet in breadth. An average of 867 pounds of sugar per clarifier has been obtained for the season, the maximum density of the juice being 9°, and the minimum as low as 4½°. The boiling hours required for reducing the juice obtained per day, are from 5:30 a. m. to 5:30 p. m. The crop for 1883–4 has been 1860 tons. The average crop for the past five years has been 1800 tons, one-third of which has been given to the cultivators of the cane under most favorable contracts. The plantation has this year planted its own crop of 325 acres, under such a systematic arrangement of teams and laborers as to complete the job within a period of two months. Taking into consideration the present low prices of sugar the outlook for the future is most favorable. The number of laborers employed averages less than 270 per day.

RESERVOIR AT HANAMAULU, KAUAI.

Mr. A. S. Wilcox of the Hanamaulu Plantation, has had a large reservoir built, for the purpose of holding water for irrigation purposes. The work was done under contract by Mr. A. Loebenstein, to whom we are indebted for the following particulars concerning the construction of the reservoir:

The reservoir covers an area of land about 9 acres in extent, and is in a natural basin, which like most of the gulches on Kauai has a very flat lay of land, the decrease in depth consequently being very slight to the length, since the water backs up from the dam to a distance of at least a quarter of a mile.

The dam is 466 feet in length, 115 feet from toe to toe in the middle of the gulch, 28 feet high, 8 feet wide across the top, and at the average height of the water in the reservoir, 23 feet through. The risk of an outlet by means of a pipe through the dam, generally considered a source of weakness to the latter, has been avoided by a tunnel in the side hill forming one of the walls of the reservoir. This tunnel is 125 feet long, including the cuts on each end it is over 200 feet; its floor is even with the lowest level of the reservoir; it is 5 feet high by 2½ feet across; it is cut through semidisintegrated lava. Only two large boulders were encountered in the progress of this part of the work. The water is released through a slide-gate at the upper end of the tunnel, set in 10 feet of masonry covering the mouth, which is 24 inches in diameter. The gate was cast by the Honolulu Iron Works. A long stem with screw cut on the end, and working in a wheel socket threaded accomplishes the opening and closing, from a staging and trestle extending from the top of the dam.

In the building of this embankment all the sod and surface stuff had first to be removed, until clay was struck. Trenches extending longitudinally along the site were afterwards dug. The topography of the land precluded sluicing to any great extent, still about 3,000 cubic yards of clay dirt were run into place very economically. Considerable was done with scoops and scrapers, but by far the most with carts drawn by oxen. These carts were filled with dirt ploughed up from a rise above the embankment, the hollow thus left constituting the weir or overflow, This overflow is 150 feet wide and about 300 feet long, leveled with the instrument, and prevents freshets or other accidents from filling the reservoir beyond a safe capacity. Thus far the reservoir has not been filled to the level of the overflow by a constant running stream of four days and four nights, at the expiration of which time it still stood 2 feet below the former, and only rising at the rate of a half-inch an hour, with the large stream in the Hanamaulu ditch feeding it. With the completion of this reservoir night irrigation has been dispensed with, though no less than 45 men are employed in the work during the day. The work occupied

five months in its construction, gave employment to an average of 20 men, 15 yoke of oxen, and a number of carts.

HILO, HAWAII, August 29, 1884.

HON. C. R. BISHOP, Honolulu.

Dear Sir:—Your circular as Chairman of the Committee on Forestry, of the P. L. & S. Company, is before me.

In reply we would say, that during the last thirty years there has been comparatively little change in the extent and character of the forest of this district, except what was consumed by the lava flows of 1855–6 and 1880–1, which each cut a strip nearly through the forest, of one by twenty miles in extent; but this does not seem to affect the rainfall, the springs and streams of water, the vegetation or the climate, enough to be of any injury.

Nothing in particular has been done to protect, renew or extend the forest.

Of native trees, the Ohia lehua and the Koa do the best, at from 1,000 to 6,000 feet elevation. Of foreign trees, the Pride-of-India and the Eucalyptus seem to do best, as yet tried; the former at an elevation anywhere below 1,200 or 1,500 feet, and the latter from the sea up—probably 6,000 feet.

If the wild cattle and other stock are not allowed to become too numerous, or to range much in the forest, no other plan is needed in Hilo to protect the forest. I remain, yours truly, F. S. LYMAN.

SELECTIONS.

THE DOORWAY OF FURNACES.

The *Locomotive* concludes that probably every man who owns or has run a boiler has experienced a vast deal of trouble with the cast iron mouth-pieces around the furnace doors. These pieces invariably warp, crack, and burn out in a short time, and the firebrick lining falls down, the cast iron front becomes burned, and where the boilers are set with the flush front setting, the portion of the shell which projects beyond the front tube sheets gets overheated, which generally results in its fracture, and in many cases the longitudinal seam where the head is attached to the shell is so severely strained that it begins to leak, and sometimes this leakage is very difficult to stop, owing to the joint being permanently strained. This warping and burning away of these castings may be prevented by simply slitting them back from the edge for about one-half their depth. The slots should be from one-half to one-fourth of an inch in width, and may be from eight to twelve inches apart over the furnace door. This width is necessary, as they close up gradually under the influence of the intense furnace heat.

DIFFUSION IN LOUISIANA.

At a recent meeting of the Sugar Planters' Association held in New Orleans, the subject of diffusion attracted mnch attention. The following petition was adopted by the Association.

To the Hon. George B. Loring, Commissioner of Agriculture, Washington, D. C.:

SIR—The prodigious advance in German beet root sugar manufacture has so greatly depressed the industry in this country as to stimulate inquiry as to the means employed by which their wonderful results are obtained.

Among their various appliances we note that diffusion is one of if not the most important and useful of their successful operations, a system which we learn by Prof. Wiley's report was successfully tried in experiments with sorghum cane, and which was also tried with substantially the same result with sugar cane in Guadaloupe.

An effort at diffusion in this State several years ago was abandoned after several tests, owing to imperfectness of the apparatus employed, and the lack of evaporating capacity of the sugar house in which the effort was made.

We learn that you are now constructing a diffusion apparatus with a view to demonstrate on a large scale, with sugar cane, the experiments of Prof. Wiley so successfully made with sorghum cane. We beg to express our grateful acknowledgment of the inestimable service your proposed action will be to the sugar industry, and especially to our interests in the cane-growing districts, and we trust that it may be in your power to have it ready for operation during our next sugar season, beginning about the 15th of October.

Our best sugar mills have succeeded in extracting about 70 per cent. of juice from the cane, losing about 40 per cent., and with all the efforts made and money spent in experiments to increase the yield it seems that this is about the maximum we can now obtain.

If diffusion will increase our yield of juice 20 per cent. as suggested by Prof. Wiley, or even 15 per cent., it will of itself compensate for the outlay required.

Our limited resources and the very low price of sugar prevents our planters from attempting these operations at private expense, and we recognize our obligations to Congress for the liberal appropriation it has made for this purpose. We regard your zeal in our behalf as the most encouraging sign of a renewal of our prosperity.

Mr. H. C. Warmoth, of Magnolia plantation, has authorized the association to offer the facilities of his sugar house for the erection of the apparatus. It is most thoroughly equipped, and contains abundance of steam power, clear water and evaporating capacity. We recommend this place as in every way suited to a thorough test of the diffusion method and its relative value, as compared with our present methods.

ORIGIN OF SUGARS.

The sugars we use are wholly of vegetable origin. There are mineral sweets; for example, sugar of lead, which is a poison, and some compounds of silver, but mineral sweets are never used in the culinary process.

The ancients depended for their sweets on honey and on grape sugar. Not until the fifteenth century was the making of sugar from sugar cane an accomplished fact. Since then we have learned to make sugar from the maple, the beet and palm, from milk, potatoes, rice, sawdust, lichens, waste paper and old rags. Indeed almost any vegetable substance rich in starch can be converted by chemical processes into sugar.

Of the twenty-two different sugars as classified by chemists, the principal are derived from the grape, cane, manna, liquorice and milk. Of the last three the name indicates the origin. The manna sugars are of inferior sweetness to those made from grape and sugar cane, and they will not ferment when mingled with yeast. They are obtained from some species of the ash, the gum tree, the oak, the larch, the tamarisk and other trees. Liquorice sugar is obtained from several varieties of *Glycyrrhiza*, and is used for medicinal purposes, and by brewers in the manufacture of porter. Milk sugar is obtained from milk, the acorn being the only vegetable production in which it has been found. Its chief use is in preparation of globules for homœopaths and in the food of very young children. Under grape sugar come the varieties derived from grapes, honey, fruits, potatoes, starch and paper. Under the cane sugars come those derived from sugar cane, beets, palms, the maple, from maize and sorghum. The sugars from these various sources when completely purified is identical in composition.

All the sugars consist of three elementary bodies, carbon, oxygen and hydrogen. In all of them the hydrogen and oxygen are in proportions to form water, so we may speak of sugar as composed of carbon or coal and water. The quantity of carbon is constant but that of water varies. In cane sugar there are six atoms of carbon, twenty-four of hydrogen, and twelve of oxygen. In grape sugar there are six atoms of carbon, twelve of hydrogen and six of oxygen. Glucose, about which so much has been said lately, is a term applied to a class of sugars similar in chemical composition, but differing in some of their properties. It occurs naturally in acid fruits of various kinds, in honey and in diabetic urine. When produced in the laboratory it is called inverted sugar, starch sugar, potato sugar, rag sugar, from the substances of which it is made. These various substances are boiled some time with dilute sulphuric acid, the acid is neutralized by lime or some other agent, and the sugar is obtained by filtering, evaporation and crystallization. Chemists of high attainment and authority have decided that glucose, though inferior to the best cane sugar, is not poisonous or unwholesome, as was at one time charged.

The chemical formula for the different varieties of glucose is the same given above as that of grape sugar.

Those who would get one point nearer to understanding why and how cane and grape sugar differ so widely from each other, must read the new chemistries and become initiated into the mysteries of the graphic formulas of isomeric bodies. The knowledge will be sweet and will certainly make the sugar sweeter.

There is no one vegetable production, unless it be cotton, that is of so great importance to the race as sugar. The estimated yearly production is over three and a half million tons, of which more than half is from sugar cane. The consumption per head in the United States is given as nearly thirty-eight pounds, and though we are considered a sugar-eating people, our Canadian friends consume eighty-six pounds apiece, our English cousins sixty-three pounds apiece, our Australian brethren eighty-six pounds apiece, while in Venezuela the allotment is 180 pounds annually to each individual.

MILL VS. DIFFUSION.

The following is what a correspondent of the *Sugar Bowl* thinks upon this subject:

I have remarked with deepest satisfaction the change from a purely neutral position to that of expressed conviction and aggression on the part of your paper. That at last the diffusion battery should have found in the *Sugar Bowl* a pronounced friend lends hope.

The cane-mill is a failure, whether of three, five or thirty-five rolls! Its best friends must admit that it does not accomplish what is desired of it, even in the best of hands—that it cannot be made to do this. No mill ever has and no mill ever will attain, no matter how favorable the conditions, such results as Prof. Wiley has achieved with sorghum, and Minchin with tropical cane—such as Mr. Seig and experience can teach us all to secure from our own crops by means of this simple principle—Osmosis—which Nature has selected as her own for many good ends and illustrated so bountifully both in vegetable and animal physiology. What would be thought of an extraction of 96.96 per cent. of all the contained sugar from our canes by milling? Or of bagasse which should give "scarcely a chemical trace" of sucrose, even as the result of a short, experimental run? Nature cannot be forced as she can be coaxed and cajoled. The chemist and the physicist know this, albeit Louisiana's practical men, her machinists and planters, have been tardy in recognizing the fact.

The mill and its friends have had their opportunity and have failed to save the world's cane industry from the very apparatus which they traduce and which as applied to an inferior raw material, appears likely to drive cane-mill, cane and cane-planter alike to the wall! The time is ripe for diffusion! Perhaps it is over ripe! If so, the planter has none but

himself to censure! He has his first cent yet to spend, his first effort yet to contribute to the introduction of this process among us—a process which by its application a decade since might have enriched the whole State.

It is senseless to talk of its past ill-success in Louisiana. Technically there was no real failure; rather marked success attained. Our people simply failed to detect a difference as between the apparent and the real, in the unfortunate financial termination of the whole affair! But had these former trials been, as has been claimed, genuine and unmitigated failures in every aspect, what of this now? The diffusion battery of 1884 is no longer the thing it was in 1874, even in Europe.

SALT FOR SHEEP.

An American journal of influence, the *Texas Wool Grower*, makes the following pertinent remarks on the subject of salting sheep, well worth attention in Queensland:—Authorities all agree that salt is indispensable to the health of sheep, and that if they have free access to it at all times, they will never eat too much of it. In Texas, very seldom does it happen that sheep get a sufficiency. Owners of a thousand sheep buy a few barrels a year, and give it when they think of it. The amount necessary to the good health of the sheep is seldom taken into consideration. It will result in a benefit to flock-masters if more attention is given to this important subject; if they will salt more often, see that the sheep get clean salt, and see they have enough of it; they will finally be surprised to see how much sheep will eat, how heartily they will feed afterwards, how much more readily they will go to water, how strong they will become, how bright they will appear generally. What may be said—is salt a cure for all diseases? No, it is not; but it is a certain prevention for some. It is an appetiser, and of a kind it is feed. Without it sheep may live, with an insufficiency they may rub along, but with abundance they will eat heartily of the grasses and hay that without it would lack taste, and are neglected. Did you ever put up hay and salt it, and notice how quickly it was consumed—how well stock thrive on it? If you did, and have had a stack of moulded, unsalted hay to waste on your hands, you will appreciate the difference. One is health-giving, sustaining, sweet to the taste; and the other a substitute, a filling, barely serving the purpose of feed. If sheep require salt, and require it they certainly do, they require it every day. We cannot salt the grass as it is eaten, but we can do the next best thing—we can see that sheep have salt within reach at least once a day, and allow nature to decide how much and how often they require it.

From returns recently made, the Demerara cane-fields only average a sugar production of 1½ tons per acre, even with improved cultivation and powerful machinery.

BENEFIT OF LIME FOR PEACH TREES.

Several years since, the leaves of a favorite tree began to turn yellow early in the summer, and a little after the fruit commenced drying up and falling off. We dug out the soil in a circle of two feet or more around the trunk, clean down to the roots and between them. We then scattered a peck of slacked lime and charcoal dust, mixed half and half together over this open space, and covered it with the soil which had been taken out. There was no change in the foliage of the tree that season, but the next spring it blossomed freely, the leaves came out a deep green, and it bore a fair crop of extra-sized luscious fruit and continued to do so every other year till it died of old age. This mixture of lime and charcoal had another beneficial effect, it ever after kept the worms out of the trunk of the tree near the roots, thus saving probing trees during the season for the destructive creatures. A neighbor of ours experienced the following benefit to a peach tree from lime which had been mixed up in mortar. A quantity of this, the refuse of a bed which had been made to plaster a house, was scattered round the tree from its trunk a little beyond the spread of its branches. This was ploughed in to almost the depth of the soil over the roots the next spring, and this year the tree has borne as heavy a crop of fruit as the limbs could sustain.

MAHOGANY TREES.

Mahogany grows chiefly in the West Indies and Honduras. The tree is very beautiful; it has a large trunk and thick foliage. It is propagated by seed, and frequently grows among rocks where there is but little soil.

Workmen build a scaffold in order to fell the tree. The logs are drawn to the water by bullocks, and the initials of the owners are then carved on them, when they are floated down the river, and out to the ships.

Mahogany was first brought to England at the end of the seventeenth century—the first wood brought over being used to make a candle box.—*Jardinero.*

CLOVES.

These useful products are the flower buds of the *Caryophillus Aromaticus*, which grows in the Moluccas in the East Indies, This plant is an evergreen, with long shining leaves and bunches of sweet smelling flowers. The cloves are gathered before they open, and dried in the sun. A tree twelve years old will yield from five to twenty pounds annually, and the quantity increases until it reaches as much as sixty pounds. It may easily be perceived that the clove is a prolific tree, and that its culture is highly profitable. The name is said to be derived from "clou," the French word for a small nail.