

THE
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OF THE HAWAIIAN ISLANDS.

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[NO. 10

The annual meeting of the Planters' Labor and Supply Company will open in this city on Monday, October 29.

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Mr. Seth Richards, of Oakland, California, has an orange orchard of 10,000 trees of the navel orange variety, covering one hundred acres in Pomona, Southern California, and is now planting another hundred acres adjoining in the same fruit, making a total of 20,000 trees, which is believed to be the largest orange orchard in the world.

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The latest statement of the New York sugar market is to October 9, when sales of Cuban centrifugals 96° test were quoted at 6½ cents, while holders asked 6¾ cents. The future price depends largely on the yield of the European beet crop, which is now being harvested. At present the stocks of raw sugar in the principal markets are much lower than in former years, while the consumption is increasing largely.

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In a notice of Young's automatic vacuum cleaning pan, after giving a full description of its operation, the *Louisiana Planter* says of it: "The idea is a beautiful one, and from the success in the past in the Sandwich Islands, and the fact that they are now building more, they would seem to be practical success. As by this means cane-juice can be made into sugar without ever exceeding 160° F. heat, we seem to have here a means of entirely avoiding inversion. After the juice is once extracted inversion appears now to be our main source of loss, and comes from heat or fermentation. By cleanliness and speed we may

avoid fermentation, and now it seems, by the Young's vacuum cleaning pan, we may avoid inversion by heat. It is to be hoped that we may get some exact figures from the Sandwich Islands as to the real gain resulting from the use of the pan, and also that some one of our enterprising Louisiana planters will make a test of it here."

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A gentleman residing on East Maui calls our attention to the destruction of the groves of koa and kukui trees on that island by worms. On cutting down some large trees lately, the trunks were found alive with these worms, for which there is no remedy unless birds are introduced to feed on them. The woodpecker has been suggested, as it is well known that this bird lives on the insects that infest trees in other countries. Anyone who has been in the American forests can recall the way which it searches for its food by rapping on the trunk of a tree till it finds a section which sounds hollow, then it commences boring a hole until it reaches the cavity where the vermin are found often in large numbers. The introduction of the woodpecker might serve to check the rapid decrease of our mountain forests, as the mynahs have destroyed the millions of caterpillars which twenty years annually blighted the pastures all over the island of Oahu.

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OUR NATIONAL FINANCES.

The quarterly reports of the Minister of Finance, issued during the past twelve months, have each showed a more favorable condition of the public finances than its predecessor. The latest report, issued on September 30, shows the total avails for the quarter to have been \$504,390, and the balance on hand September 30, \$144,538. Of the payments made during the quarter several large sums have been on account of previous administrations, which will not again recur. If we rightly understand, the Government has settled all old claims against it, and is now owing nothing except its bonded debt of about \$1,800,000, drawing six per cent. interest, which has from twenty to thirty years to run, at the option of the Government.

Never in its history have the finances of the Hawaiian Government been in a more prosperous condition than to-day. With a constantly-increasing income from the Custom House bureau, now amounting to over five hundred thousand dollars per annum; with receipts of nearly a half million more from the moderate tax of one per cent. levied on real and personal estate; with a coin reserve in its vaults sufficient to pay on demand every dollar of the paper money in circulation; and with increased receipts from every department, the aggregate

amounting to over one and a half millions of dollars annually, Hawaiians may well be satisfied with the new order of things under the present Administration.

No better evidence can be furnished to refute the malicious statements which have been industriously telegraphed from San Francisco across the American Continent to Europe, intended to disparage our national financial reputation, than the fact that the present income of the Hawaiian Government is sufficient to pay all its current expenses, and furnish a reserve to pay its national bonds whenever payment of them is called for. During the past sixty days the Minister of Finance has refused to issue any bonds except to depositors in the Postal Savings Banks, and has been compelled to decline urgent applications for bonds from our leading capitalists and others residing in America and England to the amount of about \$150,000. Official notice of such refusal has been issued in the local papers by the Government. The deposits in the Hawaiian Postal Savings Banks are increasing so rapidly that it is now believed that from this and other sources the Hawaiian Government may be compelled to call in the bonds now held in England, within five years at the farthest, although they were issued for terms of twenty and thirty years.

This is one of the legitimate results of the popular uprising of 1887, and so long as the finances of the country are administered by the same able and careful hands that now have charge of them, the false statements referred to as having been published abroad can work no permanent injury to Hawaii.

In a word, the latest commercial and financial exhibits of the Government of Hawaii show a prosperity and soundness which it has never heretofore possessed.

HAWAIIAN TRADE STATISTICS.

The table of exports for the first nine months of 1888, prepared by the Collector-General, and published in the weekly *Gazette*, exhibit a healthy condition of the trade of the Kingdom, most of the leading staples showing a steady increase. For the period named, the exports of sugar have been over two hundred and three millions of pounds, and of rice over nine millions pounds, these being the leading products, and both encouraged by the Reciprocity Treaty with the United States, to which all the shipments are made. The proposed reduction of duties on these articles, estimated at 25 to 40 per cent., now pending in Congress, although it may be distasteful to those engaged in sugar and rice, will be far better than their total abolition or the termination of the Reciprocity Treaty, which must eventually take place. It behooves our planters to be prepared for these changes, by economical man-

agement, and by extending the area of land planted, so as by larger crops to make up any deficiency in the price obtained for the product.

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WITH OUR READERS.

The communication of P. Horsin-Deon, of Paris, on page 4, should be read by every person interested in cane sugar. It sets forth very clearly the rivalry that is going on between beet and cane sugar, and the extraordinary success attending the former, attributable in part to superior skill in its cultivation and manufacture. And the same agencies which have heretofore been employed in bringing it to perfection are vigorously at work to make beet sugar the leading staple of the future. It is not generally known that Russia is surpassing all other European nations in the richness and quality of its beet sugar. But even in Russia this industry has been built up only by the aid of Government bounties.

A very interesting account of the products and resources of the West Indies was begun on page 412, and is continued on page 445, being an address delivered in London by Dr. Morris, who has for several years been connected with the Jamaica Botanic Gardens. There is so much similarity between these islands and the West Indies in climate, soil and productive capabilities, that their experiences, successes or failures may be studied with advantage by us. The author, in his address, well says that "no colony can now-a-days be permanently prosperous if entirely dependent on a single industry"—a truth which should not be forgotten by Hawaiians. The origin and growth of some of their minor industries will be observed; for instance, logwood, the export of which now amounts to about one million dollars per annum; cinchona, tea, spices, cacao and sisel hemp. Nearly all the productions mentioned in the article will probably grow here as profitably as there, and more attention should be directed to the introduction of such as have not yet been brought here.

Mr. Golding's paper on the "Selection and Design of Steam Boilers," page 452, although it may seem to be indited in the interest of one particular class of boilers, will provoke discussion regarding his theories. There is a vast amount of money sunk or wasted in the use of boilers which are unsuited for the work intended, or are rendered expensive by the manner in which they are set and kept.

Few persons, when seasoning their food with pepper, cloves, nutmegs, etc., know just where spices come from, or the extent of the traffic in them. In the last number of this monthly (page 405) was commenced an article on "Spices," which is continued in this issue on page 455. We insert it not so much

for its statistical information as to call attention to the possibilities of our own little group of islands, for every one of the shrubs and trees that produce cinnamon, cassia, allspice, pepper, cloves, etc., mentioned in it, will grow here as well as in the countries referred to. Several of them are now to be seen in the Government Nursery on King street and in private gardens, cultivated solely as an ornament or curiosity. The time will, doubtless, come when spices will be grown here for export.

"The Land Question in Hawaii," as described by Hon. W. R. Castle, on pages 263 to 270, is a valuable exposition of a subject with which very few are familiar, and about which everyone desires to obtain correct information. The facts which he states regarding the general division of the lands into the King's lands, Crown lands, Government lands and *kuleanas*, or homesteads, awarded to the common people, form the foundation of our system of land tenure. And where any party secures a title based on either of these original awards, with its metes and bounds described, it is practically a perfect title. The article sets forth the possibilities of Hawaii, when it shall be peopled with an industrious people, in a more hopeful view than is generally presented.

The article on sugar-making in Arizona reads like a fairy tale to those who have traveled through it and seen its arid desert lands, where neither tree nor shrub will thrive. But when we recall the condition of Spreckelsville, on Maui, twelve or fifteen years ago, and see what changes irrigation can produce in marketing ten or twelve thousand tons of sugar a year, we shall not be surprised if Arizona produces cane and beet sugar sufficient to supply her own wants at least.

THE ELECTRIC SUGAR REFINERY.

On the 9th of September, says Willett & Hamlen's circular, the machinery of this refinery was sufficiently advanced towards completion to allow of a preliminary demonstration in the presence of several gentlemen, to which we were invited. Raw sugar passed into a secret room containing the refining apparatus, from thence it passed into a secret room on the floor below containing the granulators, from whence it passed in a completely refined state through spouts into barrels on the floor below. We saw the raw sugar and the refined, but not the progress of the transition through the secret rooms, although we heard the machinery in operation, and can say that the refined sugar came into the barrels direct from some machine, in three different grades of apparently quite fresh manufacture—the time occupied from the starting of the raw to the appearance of refined being twenty-five minutes, and a

barrel being filled regularly every two minutes when in full operation. About thirteen barrels were thus produced when the trial ended in consequence of injury to the machinery. In addition to the three grades mentioned, eight other grades were made at this trial and by subsequent private trials by the operator. We understand grades can be made and changed by changing plates in the granulators. The eleven grades now shown represent all grades of hard refined, from powdered to blocks of large size, many of the grades, if not all, being quite unlike sugar of the regular refineries—some experts saying that some of the grades could not possibly have been made by the process of melting raw sugar in use by refiners. The "Electric" Company's process claims to be "a dry process throughout, dispensing altogether with boiling and the use of bone-black. No syrup whatever is produced, but the whole is hard sugar of nearly, if not quite, absolute purity, namely, 100 per cent. cane sugar as per analysis." * * * "Raw sugar of the lowest grade can be converted as easily as the highest grade, and within one per cent. of the whole saccharine matter, whether cane or 'invert,'" and all at a minimum cost of refining. The importance of these claims, and the evidence of their fulfilment being thus far limited to the view of the sugars produced, and not to any permitted examination of the secret machinery or secret rooms, to guard against deception, the public are slow to believe in them as realities completed, and about to revolutionize the refining business. Nevertheless, it must be said that these samples, until duplicated by other refiners by their known processes, go far to prove that a new process of refining is in the possession of this company—and this is now freely admitted by many experts. Much anxiety will continue to exist until the company have completed their machinery, and have actually produced the same sugars in a sufficiently large quantity to satisfy the most sceptical. This is promised during the coming month.

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COFFEE GROWING AND CURING.

The recent effort which has been made to enlist public interest in coffee-growing by the formation of a chartered company to engage in it on a large scale, under the patronage and supervision of the Government, has unfortunately terminated in failure by the refusal of the King to approve the bill providing the sum which was deemed necessary by its friends to ensure its success. That the finest coffee in the world can be grown here is a fact that is patent to everyone; but how to grow it on a large scale in a manner to make it profitable remains yet to be demonstrated. It was the same formerly with sugar and rice; every venture in either of these staples resulted

in embarrassment and failure, and, prior to 1876, there was never a plantation of sugar or rice that paid a profit to its owner from its earnings. It was only after the Government took the matter in hand and secured from the United States what is tantamount to a bounty of two cents per pound on every pound of sugar and rice produced here, that a reasonable profit was secured, which may in time lead to our plantations being placed on such a solid basis as to continue to pay small profits after the termination of the treaty, which must eventually cease. All that was sought in the recent effort to secure legislative aid was, that the Government should co-operate with private parties and endeavor, by the introduction of new and improved machinery and the service of competent coffee-growers, to make a trial on a scale which it was thought would ensure success. It might have proved a failure; but if so, it would have been a satisfaction to know that with every advantage that could be secured by Government aid and patronage, the fact was demonstrated that Hawaii could not compete with Brazil, where liberal Government aid is given, or any other country in growing coffee, and that the thousands of acres on Hawaii, supposed to be adapted to it, must still be allowed to run waste to lantana weeds and forest.

We took up our pen however, chiefly to call attention to a new departure in coffee manufacture referred to in the London monthly report called "The Colonies and India." Mr. D. Morris, a gentleman who has resided in the West Indies, and whose address will be found on page 412 of the monthly, wrote a letter to a coffee firm in London asking for information regarding the new departure inaugurated recently in importing parchment coffee, to which he received the following reply:

"6 Mincing Lane, E. C., April 17, 1888.

"SIR:—In reply to your favor of the 16th instant, we beg to inform you that the system of importing coffee in the parchment is largely on the increase, and some most satisfactory results have been attained. We have recently sold large parcels from America which were 'milled' here, and against 70s. per cwt. obtained last year for the same coffee cleaned on the plantation we obtained 86s. per cwt., although prices all round were lower. Experience shows that the husk or parchment protects the bean from atmospheric influence, which affect the color, and in every instance where trials have been made the result has been in favor of cleaning here. The process is quite simple, and the cost is 2s. 6d. per cwt., including everything. The coffee must be pulped, and the cherry got rid of on the plantation, but the most important matter is the drying. It is absolutely necessary that the parchment must be perfectly dried and kept from moisture afterwards; insufficient drying

is most damaging to after results, and must have the greatest care. There is no advantage in selling the coffee in parchment, as much better prices are obtained by cleaning it here. The grower is more than compensated for extra freight paid, loss in weight, etc., by the extra good out-turn of his coffee if properly cleaned here. Any further information we can furnish we shall be most happy to give you. We enclose a sample of parchment which is worth 35s. per cwt. in parchment, and when cleaned 80s. per cwt. The probable loss in weight is about 15 or 16 per cent. There would always be a market for coffee cleaned here, and as much as the West Indian Islands could produce would easily find a market. We remain, etc.,

D. Morris, Esq. (Signed) LEWIS & PEAT."

To avoid misunderstanding, we will state that coffee, when ripe and picked from the tree resembles a red cherry rather oblong in shape. When the red husk or covering is taken off, it discloses one or two berries enclosed in parchment, which is a thin skin covering the berry. This skin or "parchment" is here always cleaned off before the coffee is bagged and sent to market. It is this "parchment" which is referred to in the extract quoted, and which dealers in London want left on to be cleaned by them there. Our own impression is that as it possesses so much of the flavor and taste of the coffee itself, the parchment may be of value in making, with the broken berries and refuse of the mill, a second quality of "ground coffee." Be this as it may, if coffee shipped to London in the parchment is worth sixteen shillings more per cwt. (112 lbs.) than coffee sent without it, the profit is worth saving if it can be secured to those who may engage in coffee-growing here or elsewhere.

Aside from this "parchment" matter, coffee-growing is a branch of agriculture that holds out greater inducements in Hawaii than any other product, except sugar and rice. The duty of three cents a pound levied on coffee imported here amounts really to a bonus of three cents on every pound grown in the country, and to this extent is a protective duty, as may be seen by the present price, which fluctuates in Honolulu according to quality from 18 to 22 cents a pound. Even at the first-named figure it ought to pay any person or company engaging in its cultivation after the enterprise fairly becomes established. For this reason we regret very much the failure of the recent effort to aid coffee-growing on such a basis as might have given a permanent impulse to a new and profitable industry, which seems to need only national help to demonstrate that it may become a successful industry, in which native and foreign labor can be advantageously combined, and Hawaii receive the credit and profit derived from a product which is incomparably superior to that grown in any other country.

CORRESPONDENCE AND SELECTIONS.

INTERESTING LETTER FROM FRANCE ON DIFFUSION, AS APPLIED TO THE MANUFACTURE OF CANE SUGAR.

360 N. RAMPART ST., NEW ORLEANS, Sept. 13, 1888.

EDITOR PLANTERS' MONTHLY :

DEAR SIR :—Inclosed please find letter which I recently received from M. Horsin-Deon, of Paris, France. I submit you a copy asking its insertion in your valuable journal, knowing that you favor progress, and at all times treat upon subjects interesting to your sections and outside. It will be with great pleasure that I will receive a copy of your periodical containing the enclosed communication treating on such a wide scale. Hoping to hear from you, I remain your obedient,

E. J. RILLIEUX.

MONS. E. J. RILLIEUX, NEW ORLEANS, LA.,

DEAR SIR :—You ask me my opinion of the progress that should be made by the cane sugar industry in order to compete with advantage with the European beet sugar industry. I hereby give it to you with all frankness, in recalling to you the French saying, *Vouloir c'est pouvoir*.

COMPARISON OF THE PROGRESS OF THE CANE AND THE BEET SUGAR INDUSTRIES.

The cane sugar industry was born long before the beet sugar industry. It was upon the first that the second was modeled at the start. The beet juice in 1825 was worked like the cane juice by a simple lime defecation. But whilst the cane juice contains fifteen to eighteen per cent of sugar, and large quantities of albuminoid matters, coagulated by heat, the beet juice at that time could only count upon ten per cent of sugar at the maximum, and contained but a slight quantity of coagulable matters, hardly sufficient for the defecation. Therefore this fabrication was very difficult.

It is to be remarked that where vital difficulties present themselves there the men are industrious, whilst in the countries where life is easy the inhabitant is soft and without cerebral activity. This is why in the hot countries, where alimentation and repose are of small importance, there is not found the ingenuity of the people of those cold countries, who oppose at each moment the inclemency of their seasons to nutrition and heat.

The same state of affairs exist in industry : When a fabrication is easy it remains in infancy ; when it is difficult it pro-

gresses. It is the same again in an economical point of view : The industry that lives under the influence of protection lingers till the day when the governments withdraw their protection. That day it is a cataclysm! Many factories disappear, but those that are not sleepy in the delight of Capiro, those that have watched, resist the shock, improve their machinery and rise above the ruins of the others. It is the eternal law. Woe to those who do not recognize it. The history of the cane and beet sugar industries is contained in these few economical observations.

The manufacture of cane sugar, so easy born in the hot climates, has remained stationary or nearly so. The beet sugar manufacture, which exhibited at the start all about it so many difficulties in the way of cultivation in the fields and the work in factory, has given birth to men of genius, who have made it progress rapidly to the point of crushing its commercial rival, notwithstanding conditions under which material inferiority seemed to be doomed to its eternal lot.

How, then, has the European sugar industry progressed? It has followed two parallel roads in progress. First, in the factory it has changed its system of defecation, because the composition of the beet juice did not tally with that of cane. It has employed new apparatus, and in particular filter presses, to separate from the abundant juice which it treated the encumbering settlings. Then it has changed its mode of extraction, replacing the processes by diffusion in order to lose less sugar. Naturally, Europe borrowed from America the Rillieux apparatus to evaporate these large quantities of juice. But while in our factories the employment of the triple effect was becoming common, the remembrance even was being lost in Louisiana, its original home.

The second route that was followed was the improvement of the cultivation in such a manner that the beets of fifteen per cent of sugar are no more scarce, and in certain countries, as Russia for example, they attain readily seventeen to eighteen per cent. The beet becomes as rich as the cane. The beet is better worked ; the loss of sugar is reduced to scarcely anything. The full consummation diminishes each day, thanks moreover to Mr. Rillieux.

How can the cane sugar industry hold out? The cane sugar industry can resist if it wishes to awaken from the somnolency into which it has been plunged by climatic influences and government protection. If it wishes, in a word, *to operate*, it will be able to retake its rank in the world—the rank it is on the eve of losing forever. Firstly, take pains with its cultivation, revive the plants, fertilize its fields so as to have everywhere thick and rich cane. The principal point is to have a rational cultivation that gives the most possible sugar. It is necessary

also that planters associate themselves to sustain a sugar factory of sufficient dimensions, and not have a number of small factories, that the general expenses will crush, and that are accordingly unable to maintain a *technical personnel*. It is necessary by association to support factories large enough to be able to employ a choice personnel—a chemist with his laboratory and all that can aid to work in the factory in a normal and economical fashion. Finally, its operating methods and material must be select.

Will the cane sugar industry in her turn copy from the beet sugar industry, and borrow its material and its methods, so well perfected? No, it would be going too far. The material used in beet sugar factories costs very high, and if we employ it, it is because the composition of the juice does not allow us to do otherwise. Our carbonization, with all its implements of lime, furnaces, pumps, etc., is to you useless. You have juices purer than ours, more easily coagulated than ours; profit by them, and do not frivolously waste richness that nature gave you. Copy our evaporating apparatus, our apparatus of heating, of turbinage; there is nothing better, as all this work is the same in the two industries. But beware of losing the native qualities of your juice, which allow you easy and economical work. What is required in the extraction department of the cane sugar factory? It requires a system that allows the extraction from the bagasse of the most sugar possible in such a manner as not to lose too much of the sugar principle, as is done for the beet. The chemical qualities of the juice must be preserved, which allow easy work. Finally, it is necessary that after all this treatment the bagasse be combustible, and that the factory be arranged in such a manner that the bagasse *alone* will serve as fuel for all the work, to the exclusion of all other auxiliary fuel. Wood or coal you must not buy, since you have the bagasse combustible free.

It is evident that under these conditions, the cane sugar industry will rise anew, if it produces rich canes; if it does not lose sugar in its bagasse and in its scums; if it does not purchase fuel, and if it reduces its general expenses, whilst having an instructed personnel directing thoroughly the work. To arrive at these different points, which I have just indicated, I will content myself by emphasizing what I have already said upon this subject. Take your canes to your mills, as these mills have cost you very high and are good instruments, as they leave you a burnable bagasse. But between the two mills *unsweeten* your bagasse. You will thus have your juice pretty normal, easy to defecate with lime alone, or with the addition of a small amount of soluble phosphate, as ehrmanite, that succeeds so well in Mauritius and in the Indies. No sulphuric acid, which burns the juice and clogs your triple effects. You

will have thus preserved your bagasse to burn in your generators.

To unsweeten your bagasse you require a simple apparatus, easy to arrange between the two mills. The Perret apparatus is there, awaiting but a slight amount of good will on the part of the planters to prove that it has all the required qualities—accessible price, complete facility for the circulation of the bagasse, unsweetening assured, with the minimum water possible, labor nearly null—all you need is here. What difference between this rational work and the one of diffusion by battery, which forces you to employ carbonization and all its expensive implements, its labor unusual in the cane countries, and besides all which, deprives the factory of its natural fuel, compels you to buy coal which must be paid by the few pounds of sugar that it brings to the manufacturer. Moreover, the Perret diffuser joined to the mills extracts as much sugar from the cane as diffusion by battery; and leaves the bagasse intact, which assures a gain largely superior to the one resulting from the employment of diffusion batteries. This is why I defend it so openly, and why I engage the planters to adopt it in preference to all other systems of diffusion.

Having the juice worked, filtered, it must be evaporated, etc., and for this we were saying employ the bagasse *alone*. This problem is easy to solve.

The calculation is easily made in estimating the caloric power of the bagasse according to its dampness, and employing such system of evaporation as is adapted to the different circumstances. To such a factory a triple effect will suffice, whilst others will have to employ a quadruple effect, with its cooking at multiple effects, and the heating according to the system taught and employed in Europe. Hence all these innovations, *indispensable* to the cane sugar industry, if it wishes to come out of the bad course which it is pursuing, are easy to introduce, do not present grave difficulties, only claims on the planters' energy and good will. The American people know how to show its great qualities when it wishes. To-day it must make use of it, otherwise ruin at short notice. Nearly all that which precedes is applicable equally to sorgho, except what refers to fuel. This fabrication being more recent it is requisite that the planters take immediately the apparatus and the modes of manufacture the most suitable to their industry, in order that they may not have to fall back later upon the habits already acquired, as it is more difficult to conquer a prejudice than to make successful at the first attempt.

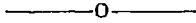
We engage, then, that the manufacturers of sorgho can immediately make their profits out of the beet sugar industry's progress and of the cane sugar industry's gropings; can take with the greatest ease and without hesitation the good road

that will bring them to success without loss of time and without having need of the protection that the government allows to-day to the sugar industry. Let the industry profit by this protection as long as it lasts, but let this industry not base itself upon the existing conditions.

Receive, Sir, my sincere salutations,

P. HORSIN-DEON.

Paris, August 17, 1888.



VEGETABLE RESOURCES OF THE WEST INDIES.

AN ADDRESS BY MR. D. MORRIS, M.A., F.L.S., DELIVERED BEFORE
THE LONDON CHAMBER OF COMMERCE ON TUESDAY, MARCH
27TH, 1888, J. ANTHONY FROUDE, ESQ., IN THE CHAIR.

(Concluded.)

BOTANICAL STATIONS.

What has been done by the Botanical Gardens at Jamaica, and is being done by the excellent gardens at Trinidad and British Guiana, indicates a very important means whereby the other islands may be benefitted. The latter islands, it must be remembered, are small and comparatively isolated. Their smallness and their isolation have, indeed, been the chief operating causes in their backwardness. To assist them in developing industries suited to their circumstances, a scheme of Botanical Stations has been devised, which is now partly in operation. This scheme was first suggested in the Report of the Royal Commission of 1883. It was strongly supported by Sir Joseph Hooker, and accepted by the local legislatures with the approval of the Secretary of State for the Colonies. The scheme provided for the establishment, in each island not already supplied with a Botanical Garden, of a small and inexpensive establishment called a Botanical Station. The details of the scheme have been already fully discussed, and may be known to many here to-day. The chief points involved are the maintenance of a nursery and a depot for plants in each island, and the diffusion by means of bulletins of practical hints as regards their treatment and cultivation. The stations would be affiliated either to the Botanical Gardens at Jamaica or Trinidad, and it would receive from these gardens seeds and plants on payment in accordance with an established schedule of prices. It may be gathered that such a scheme of botanical stations for the lesser West Indian Islands seeks to meet the special circumstances under which they are now placed, and to do so in the most flexible and economical manner. It is evident by the adoption of such a scheme, which practically

amounts to a botanical federation for purely economical purposes, these islands will be enabled to act much more thoroughly and economically, as a whole, than if each one depended entirely upon its own resources.

The Government of Jamaica has cordially given its assent to the scheme, and stations are already established at Barbadoes and St. Lucia, and a botanical garden at Grenada. Unfortunately, the islands of St. Vincent and Tobago, which most require the services of a botanical station, are said to be too poor even to afford the cost of so moderate an outlay as is here involved. In the Leeward Islands, comprising Dominica, Antigua, Montserrat, St. Kitts and Nevis, and the Virgin Islands, although the scheme was accepted by the local legislatures in 1885, it has not yet been put into force. The backward condition of Dominica, which is third in size of the British West India Islands, is simply deplorable. The great part is still unopened forest. It possesses such natural resources of soil and climate, that nothing is wanting but the right application of capital and energy to make it one of the most prosperous of our tropical dependencies. Its finances are said to be so low at present as not to admit even of the simplest attempt being made to develop local industries. The Leeward Islands should possess a well organized Botanical Department similar to Jamaica and Trinidad. At present, they are completely cut off from all means of starting new industries, and the local policy which has thus isolated and crippled them, is alone responsible for their present unsatisfactory condition.

I conceive that no mission could be nobler and worthier for those interested in these islands, than to bring a prosperity to them at all proportionate to their resources of material wealth and natural beauty.

SOIL AND LABOR.

There is practically very little land in the West Indies which is not capable of some cultivation. It should be remembered that the vast tea industry of Ceylon, now worth £800,000 annually, has been established for the most part on exhausted coffee lands. The Sisal hemp industry of Yucatan, of the annual value of nearly a million sterling, exists under such conditions of aridity and sterility of soil as are found in few of the West India Islands.

There is no lack of good soil in the West Indies. It is too commonly assumed that most of the rich soil in these islands has already been under cultivation, and that it is nearly exhausted. It is true that much land once under sugar has been abandoned. But it is these lands which now support a flourishing fruit industry. The hilly lands in many of the West India Islands are practically untouched. Only about one-eighth of

Trinidad is occupied by cultivation. In Jamaica, in the Blue Mountain districts, there are more than 100,000 acres admirably adapted for the growth of tea, coffee and cinchona; while further west there are 200,000 acres suited for the cultivation of oranges, cacao, spices and fibre plants. The high lands of St. Vincent, St. Lucia and Dominica are as innocent of cultivation as they were four hundred years ago, at the time of their discovery.

If good roads were opened into the interior of the islands, and railways extended, connecting the centers of production with the shipping ports, the lands available for cultivation would be sufficient to maintain a prosperity greater than anything yet seen in the West Indies. This prosperity, I feel convinced, must come sooner or later. The rush of planters eastwards has gone on so long that a reaction in favor of the western colonies may be safely predicted. The "labor question" in the West Indies is a well-threshed theme. I do not propose to re-open it. I would only mention that there is no doubt as to the rapid increase of the black population in these islands, and the labor question is thus in course of being solved by the most effectual means.

The chief care at present should be directed to prevent the rich and fertile lands in the West Indies being destroyed by the wasteful system of negro "provision grounds." This system is a relic of the times of slavery, when negroes were allowed to grow provisions for their own subsistence on certain portions of the estate to which they belonged. Under the present conditions, such a system is most detrimental to the negroes themselves, as well as to the best interests of the islands. To allow the negroes to destroy acre after acre of the best woodland, even on a payment of a nominal rent, is economically most disastrous. It practically amounts to an organized system of impoverishment of the soil, which in other colonies has been suppressed by strict legislative enactments. This "provision ground" cultivation has a direct bearing upon the labor supply, and it should be dealt with by the Legislature as a serious economic problem, on the solution of which the future welfare of the islands depends. If the labor of negroes, now expended in fitfully raising a few yams and cocons, was concentrated upon permanent plantations, the wealth of the islands would be enormously increased. At present the land is being systematically impoverished merely to supply the negroes with the bare means of existence. If once the negroes were taught to abandon provision ground cultivation and depend upon permanent cultivation and upon wages, the "labor question" in the West Indies generally would present no more difficulty than it does in Barbadoes. This island possesses an unlimited supply of negro labor. It is needless to say that it

has no "provision grounds," for every acre of land is under suitable cultivation, and yields abundant crops.

FOREST REPORTS.

An inquiry has recently been made into the condition of forest growth in the West Indies by Mr. E. D. M. Hooper, of the Indian Forest Department. The islands visited were Jamaica, Tobago, Grenada, St. Vincent, St. Lucia and Antigua, together with the colony of British Honduras.

The reports on all these have already been issued, with the exception of Antigua, and the report on this latter is in the press. These reports have been prepared with great care, and they cannot fail to have an appreciable effect upon the treatment and management of the forests still left in the West Indies. These forests are necessary, not only as reserves of timber to supply future wants, but as also a means of maintaining due humidity of climate, and protecting the sources of springs and rivers. Mr. Hooper has dealt with the nature, extent and value of West Indian timber trees, and he has brought together a large amount of useful information respecting the condition of the interior of the islands, and the measures which are best adapted to prevent extensive and reckless cutting down of forests necessary to their well being and future prosperity.

It is hoped that these forest reports will serve as a basis for useful legislation in the West Indies, and that all concerned will regard a rational system for the preservation of forests, and for maintaining the fertility of the soil as intimately connected with their very existence as centers of production in everything relating to plant life. Unfortunately, arrangements were not made for including Dominica, Trinidad and British Guiana in the inquiry, hence no reports have been prepared on the forests of these colonies.

LOCAL INDUSTRIES

I have, so far, discussed the general conditions affecting cultivation in the West Indies, and I shall now give a brief account of the local industries.

Next to sugar the most important industry is cacao. This is the second largest industry in Trinidad, the chief industry of Grenada; while at Jamaica, St. Lucia, and Dominica, it is receiving considerable attention. I should regard cacao as essentially a West Indian industry. It is in every way suited to their circumstances as regards soil, climate and labor supply, and the consumption of cacao is steadily increasing. Cacao has not been so successful in Ceylon as was once anticipated, and hence the West Indies should make cacao growing an industry second only to sugar. Coffee cultivation is confined chiefly to Jamaica. The high lands in Trinidad, St. Vincent, St. Lucia and Dominica are well suited for coffee plantations,

and if the produce were well cured the results would be as generally remunerative as they are with the best Blue Mountain coffee of Jamaica.

We have heard a great deal of fruit cultivation in Jamaica, and the important position to which it has attained within the last ten years. This industry is now of the annual value of nearly £300,000. It is capable of still further expansion if once a fruit trade were opened with Europe. Messrs. Scruttons have shown that it is possible to bring West Indian fruit to this country in excellent condition, and if satisfactory arrangements were made at this end to dispose expeditiously and remuneratively of the fruit it could be grown to almost any extent throughout the islands. I regard the growing of bananas as, after all, only a means to an end. The cultivation of this plant on the same land is distinctly limited. After a certain time even the best land becomes exhausted for this crop, but is well suited for the cultivation of cacao, coffee, spices and cocoanuts. Wherever bananas are grown for fruit, provision should be made for permanent plantations of something else to take their place. If this is not done, and the land is allowed to lapse into "ruinate," banana growing scarcely rises superior to the "provision growing" of the negroes. This is a subject which I have urged upon the attention of the planters in Jamaica, and I believe with some effect. If all banana plantations in Jamaica, now utilized for growing fruit, were systematically established in suitable localities with cacao, the results, ten years hence, would rival the cacao industries of Trinidad and Granada. Where cacao cannot be grown there are oranges, coffee and spices; if these are unsuitable, no land which can grow bananas will fail, at least, to grow cocoanuts. It should never, under any circumstances, be allowed to lapse into jungle and ruinate.

The cinchona cultivation in Jamaica, which is now established over some 5,000 acres in the Blue Mountains, has latterly been discouraged by exceptionally low prices. There is, however, no reason to doubt that eventually prices will improve, and those who have persevered in maintaining the cultivation will be remunerated. If Jamaica had started to plant cinchona when India and Ceylon did, the high prices of 1880-82 would have greatly assisted Blue Mountain industries. The quality of Jamaica cinchona is unquestionably good, and this fact should encourage planters to wait for a better market. Jamaica tea has lately been carefully tested, and pronounced to be specially suited to the London market. It possesses a fuller flavor than Chinese tea, but is not so harsh as Indian tea. Hence it is suitable for being used without mixing. If a tea industry were established in Jamaica to meet local demand, there is room for a small plantation. The import duty of one shilling

per pound would more than cover the extra cost of labor, while an increase in consumption might reasonably be expected. The growth of fibre plants has been started more than once in the West Indies, and even now there is an attempt being made to establish plantations of Ramie, or China Grass. I am clearly of opinion that fibre growing is still in the experimental stage. The most promising fibre industry, suited to the circumstances of the West Indies, is that of Sisal hemp (*Agave rigida*). Full particulars of this are given in the *Kew Bulletin* for March, 1887. A hemp industry could be successfully established in the Liguanea Plains, in Jamaica, and some parts of Barbadoes and Antigua. Nothing is required but to import plants from Yucatan sufficient to establish about 500 acres, and leave them on the land for five or six years, when they would be fit for cutting. Machines have been regularly used in Yucatan, which are known to be effective in producing a marketable fibre. There is nothing speculative or uncertain about the industry. The profits are small, but so are the risks. A small labor supply is only necessary, and the soil to grow the agave plants need only be hot and poor.

Spices, such as nutmegs, cloves and cardamoms, have been successfully established in Grenada, where also Colonel Duncan has shown what may be done with old sugar estates to render them most productive and remunerative. This island is destined to become the spice island of the west. The export of spices from Grenada in 1885 amounted to 987 cwt., of the value of £5,526. Time will not permit me to discuss many other minor industries. The cultivation of limes (for lime juice and citric acid), of annatto, of tobacco, ginger, essential oils, india-rubber, medicinal plants, sarsaparilla, peppers, turmeric, aloes, and tanning substances, are more or less taken up in the islands, and where the circumstances are favorable, they deserve every encouragement.

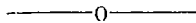
SUMMARY.

In concluding my remarks, I would point out the want of capital is traceable everywhere in the West Indies. A few years of low prices soon cripples their industries, and there is either an abandonment of cultivation, or a reduction on so large a scale that, when prices revive, they are quite unable to take advantage of them. The time has now come when the West Indies deserve a more generous and sympathetic treatment on the part of the mother country. Their credit has been lower than was deserved, and lower than the facts fully warranted. There is no reason to doubt that the cultivation of such articles in general consumption as sugar, coffee, cacao, tea, fruit and tobacco, are likely, under proper management, to prove as remunerative in the West Indies as in other tropical countries. The fashion has been to decry these islands, to

speak of the "labor question" as an insuperable barrier to progress, and to spend and lend money on worthless enterprises in Central American Republics, when it would have been just as well to have cast it into the sea.

The intelligent and progressive action taken in Jamaica to encourage industries, to open up the interior lands by roads and railways, to subsidize steamers for coasting purposes, and foreign trade is already bringing satisfactory results, and there is every hope that before long this island will have such a number of successful and permanent industries that its prosperity will be assured. It is a good sign, that in all the important islands provision is being made to teach the principles of agriculture in elementary schools, and that industrial training is recognized as a necessary element in the education of the black population. If habits of industry are inculcated in schools, and a suitable training provided for those whose lot it is to be concerned in agricultural pursuits, there is every hope of ultimate improvement.

The West Indies are becoming more widely known, and their circumstances are much more familiar than they were some twenty or thirty years ago. It is now very clearly shown that the climate in such islands as Jamaica is most pleasant and agreeable in the hills, and the conditions of life there are well suited to men of moderate means, who have to escape the rigors of the English climate. A few hundred men similar to those who have built up the industries of Ceylon, would soon prove that capital and well directed energy are alone necessary to revive the West Indies. For my part I have a strong confidence, in which I have not wavered since I knew them, that a hopeful future lies before these islands. It is within the power of many of us here to-day to help to make that future great, and to bring back something at least, of the departed glory of these West Indian Islands.—*Sugar Cane.*



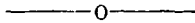
PROMPT COLLECTIONS ONE ELEMENT OF SUCCESS.

The chiefest part of success in business lies in the collection of bills, and while there are men who are born collectors, as men are born orators, writers, etc., yet a very few rules, religiously observed, will, in my judgment, place the matter of collections on a proper basis for any business. First, have your bills out on time. No matter what may interfere, if it is your practice to collect monthly, have your bills out and ready to distribute the first, and not the second or third, but the *first*, and not only on that date, but early in the morning.

Make your calls, do not be importunate nor "hanging on," but walk in, hand out your bill as a matter of course, and as if

as a matter of course it would be promptly paid. Make no apology, the bill is due, the goods delivered or the work done, and the amount due is justly and fairly yours. If any of the items are disputed and there is any reasonable doubt, make your memorandum and bow yourself out. Your first business is to *see* that the bill is right, and having satisfied yourself of that, return and make your explanations.

When a man says: "I will look it up," ask when you shall call again, and if he sets a day mark that down, and be certain to be there on that day. If Thursday, don't go Friday, but Thursday. Be polite, and *never get angry*. By being on time with your bill, by calling on the day set, by being mildly but firmly persistent, the question of collections becomes one that can be readily handled, and that is a main feature of a successful business.—*Stroller*.



SELECTION AND DESIGN OF STEAM BOILERS.

(Read before the Louisiana Sugar Planters' Association, September 13.)

There is no branch of the great subject of "Mechanics" that has been more satisfactorily written up, and upon which the writers so uniformly agree, as that of steam boiler construction and operation.

Yet, in the face of this fact, the principles so carefully demonstrated, seem to be but little understood, or entirely ignored by those intrusted with the selection and design of steam boiler plants, and by steam users generally.

Probably the most common error of the present day is the supposition that excessive heating surface adds to the evaporative capacity of a boiler. The truth is, there are well and correctly established proportions for relative heating and grate surface, beyond which there is no advantage to be gained. Equally common and fallacious is the supposition that one particular form or type of boiler will evaporate more water for a pound of coal than a boiler of a different type.

Upon this point, the authorities all agree that the type of boiler does not necessarily affect evaporative efficiency, and that under like conditions to which all forms and types may be subjected, like results are attainable.

It should be understood that a steam boiler is merely an instrument designed to receive and transmit heat; its size is a matter of capacity, dependent entirely upon the quantity of heat to be transmitted.

It has been demonstrated that the best results are attained when the heating surface of the boiler is in the proportion of forty feet square to one square foot of grate bar surface, upon which is consumed twelve pounds of coal per hour.

Whether the heating surface of the boiler is the aggregate of tubes, flues, fire box or shell, is quite immaterial, provided the surface of the plates be kept perfectly free from soot, scale and other foreign matter known as non-conductors.

With the consumption of twelve pounds of coal per hour on each square foot of grate, there will be produced a certain and constant amount of heat, which will require forty square feet of effective heating surface to absorb; and which, if not absorbed, will pass unutilized to the chimney.

It is, therefore, as essential that the heating surfaces should be kept perfectly clean from soot and scale as that the proportion of forty to one should be provided for in the original design.

In regard to form or type of boiler, it has been demonstrated that when the heating surfaces are clean there is really no appreciable difference in evaporative efficiency.

Yet it is obvious that while the tubes in the tubular type may be kept comparatively free from soot, they cannot be cleaned on the water side without removal.

It will, therefore, need no demonstration to show that the tubular type of boiler will from the beginning gradually depreciate in evaporative efficiency.

The double-flue boiler possesses the merit of being readily cleaned on every part of the inside, and of being kept free from soot on the inside of the flues, which, if carefully done, will preserve the evaporative efficiency of this type of boiler indefinitely.

The plain cylinder boiler have no flues to keep clean, and having the entire interior available for cleaning and for examination and repairs when correctly proportioned and properly set, possesses all the requirements of a safe and durable boiler of the highest evaporative efficiency.

If it be true, of which there can be no reasonable doubt, that forty to one is the proper relative proportion of heating surface to grate surface, in order to obtain the very best results, and we may here admit that, whether true or not, it will apply as well to one type of boiler as to another, let us see how the proportion will work out for the standard plain cylinder boiler 32 inches in diameter, and 32 feet long. Here we have five feet of heating surface to the foot of length, or 160 square feet of heating surface, which, divided by forty, equals four square feet of grate surface.

Now, who ever saw such a proportion of grate under a cylinder boiler? and yet it is the correct proportion, and the fact that fully four times as much grate surface would ordinarily be placed under such a boiler does not affect the principle, but only shows the necessity of observing well-established laws.

I am aware that in some cases efforts were made to utilize

the heat escaping from the excessive grate surface by making the boiler sixty, and even eighty feet long ; but here again the natural laws relating to combustion and radiation were in conflict, and this line of approach was abandoned.

Let us now examine the proportion of the standard, so called, return tubular boiler, say 63 inches diameter and 16 feet long, having sixty-three tubes 16 feet long and 4 inches diameter, and set with twenty-five square feet of grate surface. Here we have (1,100) eleven hundred square feet of heating surface to twenty-five square feet of grate surface, or a proportion of forty-four to one.

Now, if forty-four to one will do for tubular, why will it not do for plain cylinder boilers ?

The truth is, it will do, and while the results will be precisely the same while both boilers are clean, the tubular boiler will gradually foul and lose its evaporative efficiency, while the plain cylinder boiler, for reasons already given, will maintain indefinitely its original evaporative efficiency.

The foregoing, as will be observed, treats only of steam-boiler efficiency ; yet, while efficiency is the first quality of a boiler, this quality must yield in certain cases to the quality of utility, for it cannot be expected that any particular type will be the best in every case.

Take, for example, the steam fire-engine, the essential qualities of which are portableness and rapidity in getting up steam.

The first quality is accomplished by concentrating, by the tubular system, the requisite heating surface into a small space, with the smallest amount of material possible ; and the latter quality is accomplished by allowing as little space as possible for water.

If a boiler is required for unsteady work, such as running a printing press, where the work is but an hour or two in the day, a concentrated system of heating surface will be the most economical, for the reason that there will be but little heat to radiate during the hours of non-use.

When the boiler is required to furnish steam for ten or twelve hours a day, as in a factory, the best results will be attained with the double flue boiler, as it possesses every essential quality.

If the boiler is required to furnish steam continuously day and night, where excessive weight and space occupied is not objectional, the plain cylinder type will yield incomparably the best results.

The following will serve to explain the technical terms in the sense in which they are used :

Boiler efficiency: Pounds of water evaporated for pounds of coal.
Boiler capacity: Pounds of water evaporated per hour,

Boiler power: Thirty pounds of water evaporated per hour is one (1) horse power.

Heating surface: That portion of the boiler or flue exposed to the fire or product of combustion.

The heating surface in any type of boiler, should be forty square feet to each square foot of grate surface.

The draught at all times should be ample to insure the combustion of twelve pounds of coal per hour per square foot of grate surface.

From a careful perusal of the foregoing, which will be found to accord with the authorities, a careful business man will be able to decide for himself the type and capacity of the boiler best suited to his particular case.

In the early days of the steam boiler, its application and use was not restricted by reason of space or weight, efficiency and safety being then the only consideration.

With the advent of the locomotive and the steamship, new conditions were required, to meet which, the tubular system came into existence, not as an improvement or discovery, but as an expedient, thus giving rise to the error which has become universal—"that the tubular boiler makes the more steam."

We have here a lesson not dreamed of in philosophy, that while truth, the physical associate of matter, is arrested by the same impeding causes, its opponent, error, seemingly forgotten and unclassified in physics, rolls on with undiminished speed through infinite space.

W.M. GOLDING.

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THE SPICE TRADE OF NEW YORK.

(Concluded.)

The trade in ginger is very large. The importations here last year were 18,855 bags of Calcutta, 8,880 bags of African, 6,246 bags of white Cochin and 3,535 barrels of Jamaica. These figures are given in detail because they are not generally known, even among importers. The total was 4,286,160 pounds. The ginger plant is a native of India and Southern China, but is extensively cultivated in tropical America and West Africa, as well as in its native soil. Most of the ginger of commerce comes from Calcutta, but considerable is also exported from Jamaica. There are likewise large exports of preserved ginger from China and the East and West Indies. This consists of the young roots preserved in sugar after being boiled. What is known as black ginger is first scalded and then dried; it is scalded to prevent sprouting, since it is only the root of the plant which is used as a spice. White ginger is the root scraped and washed, and sometimes bleached with chloride of lime. White and black ginger are merely relative terms; the white is not perfectly so, nor is the

black perfectly black. The ginger plant either lasts two years or else considerably longer, according to the particular species. It is herbaceous, with creeping and somewhat tuberous roots, and is generally three or four feet high, with smooth, arrow-shaped leaves, and flowers about the size of a man's thumb, of a whitish color, with the tip streaked with purple. In a suitable climate it is an easy plant to cultivate, and is seen at an altitude of 5,000 feet in moist soil on the Himalaya Mountains of India. Ginger is used as a flavoring for food and medicines; it has valuable medicinal properties. It generally reaches the consumer in a powdered state, and said to be considerably adulterated. Various compounds are prepared from it. For example, essence of ginger, much used for flavoring; syrup of ginger is used chiefly by druggists; ginger tea, an infusion of ginger in boiling water, a domestic remedy for flatulence; ginger beer, a far-famed beverage, which, like another famous plant of Asia, "cheers but not inebriates;" lastly, there is ginger wine, a cheap liquor, to which alcohol is often added. Ginger comes to New York in bags holding from 110 to 120 pounds, and in barrels containing 130 pounds. Vessels regularly engaged in the West India trade bring Jamaica ginger to New York. English steamers bring the other kinds.

Many of the spice vessels stop at Calcutta on the way to New York, and there they take on what is termed in the trade "Calcutta" ginger. It is a great city of the East Indies, with a population of nearly 900,000. In a single year 658 sailing vessels and 301 steamers have arrived in its harbor. Its exports are numerous and large, and the city is the headquarters of the Governor-General of India. The name is derived from two words, Kali-Ghatta, signifying the landing place of the Goddess Kali. It has had an eventful history, and is identified with the rise of the British East India Trading Company and the establishment of British supremacy over a wide tract of India. It is sometimes called the "City of Palaces," because it has so many fine buildings. The Government edifices are especially imposing. The dwellings of the English residents are spacious and attractive, but most of the large native population live in houses built of mud or bamboo.

Last year, mace was imported to the extent of 175,890 pounds, in boxes containing sixty-six pounds each. Mace is obtained from the fleshy part which envelops the nutmeg. It is the second coat or aril, a thin, yellow substance, of waxlike texture, which covers the nutmeg, and is very fragrant and aromatic, and has a strong, but agreeable taste. It is raised mostly in the Spice Islands, but Penang and Singapore are the largest shipping markets. It comes to New York on the ships bringing general cargoes of East Indian merchandise. Part of our supply of mace comes from the Banda Isles, a group in the

Molucca Archipelago. The Moluccas, or Spice Islands, as they are generally called, are of volcanic formation and very fertile. They produce cloves, nutmegs, mace and other spices, not to mention sago, decorative woods and fruits, while the pearl and trepang fisheries have long been well known. The Banda Isles were produced by some fearful convulsion of nature, perhaps ages before man appeared on the globe, and are among the loftiest of the group. The Island of Goonong-Apee rises 7,880 feet above the sea. The four larger of these fruitful volcanic isles are devoted to the production of nutmegs and mace. The group is in constant danger of earthquakes, and the lofty island already mentioned is known as one of the most active volcanoes in the archipelago. The islands are little more than an open conservatory bearing odorous spices, with volcanic heat to stimulate the growth of the wonderful vegetation. The houses are mostly of wood, roofed with leaves, owing to the danger of earthquakes. Spices from the Banda Isles often find their way to New York by way of London, whence they are shipped on the regular steamers.

Mustard is a popular condiment, and has been known for many centuries. California raises a large crop. The mustard-tree of the Scriptures still abounds in the East, and though the seed has no aromatic pungency, it is used like ordinary mustard. The most important species known to commerce are black mustard and white mustard. The plants are natives of all parts of Europe, and are also cultivated in gardens. The white and the black seeds are ground together. Mustard is not only useful as a condiment, but is valuable as a medicine. It has stimulating properties, known to every household, and it is beneficial in some cases of indigestion. In England, white mustard, in the seed leaf, is sometimes used as a small salad, having an agreeable pungency. In India, the oil of mustard-seed is much used for lamps. In China, a species is cultivated as greens for the table, as we use spinach.

The bran of ordinary European and American seed is used in making French mustard, which is very popular. The finest mustard-seed is the black, or, as the brokers term it, the brown, which is received from Trieste. The next in point of quality is the English brown, and then comes the Dutch seed, though of the two last-named descriptions very little is received here. Large quantities of the white, or more properly, yellow, California seed, are used annually by the spice-mills of New York. It is cheap, and it makes itself felt. The Trieste sells at 7 to 8 cents a pound at wholesale, and the English and Dutch from 5½ to 6 cents, but the California is obtainable at 4½ to 4¾ cents. When there is an especially brisk market, the California seed is sent overland by rail to New York, but usually it comes in sailing vessels that go around Cape Horn, as in the "good old

days" before regular mail steamers to the Isthmus and the Panama railroad were ever dreamed of on the Pacific Coast. It takes from 80 to 150 days for these ships to make the Cape Horn voyage, according to the wind, and, besides mustard-seed, they bring wool, raw sugar, wine, and the salmon of the Oregon, which assuredly hears something besides its own dashings in these days of feverish activity in trade and commerce. The foreign seed is often sent from the Mediterranean to London, and then transhipped to New York, though it also comes direct from Sicily. Some comes from Bombay. The fruit-steamers from Sicily bring considerable quantities.

Curry-powder is a preparation borrowed from India. It is composed of turmeric and various spices. In India and elsewhere it is largely used as a seasoning for a large variety of dishes. It often consists of turmeric powder, coriander-seed powder, black pepper, fenugreek, ginger, Cayenne pepper and cumin-seed. Sometimes the recipes include scorched mustard, mace, cinnamon and cardamoms. This agreeably stimulating preparation is largely manufactured by the various spice companies of New York.

Sweet marjoram is extensively used as a seasoning in cookery. The plant is a native of Greece and the East. Thyme is a half-shrubby plant long known as a flavoring for various dishes. The garden thyme is the most fragrant. It grows in all parts of Europe and in the north of Asia, but is not indigenous in this country. "I know a bank where the wild thyme grows" is a familiar line from Shakespeare. It is an humble plant, but grateful to the smell and the taste. Wholesale houses here sell it in powdered form in boxes and barrels. Savory is largely sold here. The plant has lilac or white flowers. It has a strong and agreeable aromatic taste and smell, and is used for flavoring dishes. Winter savory and summer savory are used for the same purposes. Sage in powdered form flavors not a few dishes, and it is also used in the leaf. It grows wild, and is also cultivated. The whole plant has an aromatic smell, penetrating and peculiar, somewhat like that of camphor; and it has also an aromatic taste, rather bitter, but nevertheless agreeable, and is more generally known in the household kitchen than other sweet herbs. It is much used in flavoring meats and sauces. Italian sage is sold here by the bale.

Pickles are really a condiment, and are therefore worth a word in passing. If used judiciously, they stimulate the appetite; properly made, they are not unwholesome, and are often, indeed, decidedly agreeable additions to the table. There is the celebrated Spanish pickle; it is a mixture of the red cabbage and slices of the large Spanish onion. Gherkins are very young cucumbers prepared with especial care to preserve their green color. Sometimes in cabbage pickles, in which the red

vegetable is always employed, a few slices of beetroot are added. Cochineal is sometimes used to improve the color and ginger, mace and white and black peppercorns are used as spices. French beans, onions, eschalots, walnuts, mushrooms, nasturtiums, cauliflowers, capers and other vegetables and fruits are extensively used in pickling, and the trade requires large quantities of spices annually. Pickles are sometimes colored by boiling the vinegar in copper vessels, and thus forming the green-colored acetate of copper, or even by directly adding that poison—a fact that has led to serious results; but this baneful practice is believed to be much less prevalent than formerly.

Capers are the delight of the *gourmand*, and have long been used as a condiment and as an ingredient in sauces. It is more particularly used with boiled mutton, though also employed with other meats. They are simply the pickled flowers of the caper-bush, of a slightly bitter and yet agreeably pungent taste. The caper-bush is a native of Southern Europe and of other countries near the Mediterranean Sea. It is found on Mount Sinai. It decorates ancient ruins, clothing them in a trailing garment of green as beautiful as the English ivy. It is a rambling shrub, in other words, that flourishes most in dry places, and it is often found growing on rocks and the walls of ruins. It flowers from early summer till winter. The caper, which contributes so much to the satisfaction of the epicure, is simply the half-opened buds of the caper-bush. They are gathered every morning, and at once put into vinegar and salt. At the end of the season they are sorted according to their size and color. The larger buds are packed in small barrels, but the smaller and greener, being the most prized, are sent to market in bottles after having again been put in vinegar. The fruit of the bush is a small berry, and that is also pickled in some parts of Italy. Sometimes acetate of copper has been used to change the grayish-green color of the pickled capers to a brighter or more emerald-like hue, and this, of course, makes them dangerous. The presence of copper in a jar of capers can be detected by thrusting a polished iron rod into the vessel. If copper is present the rod will soon become coated with it. The English and French steamers annually bring large quantities of various spices, condiments and sweet herbs to New York to gladden the epicure and satisfy the popular demand for stimulants, which is unquestionably very great in a nation of such restless energy as ours.

Olives are a condiment highly esteemed after a taste for them has been acquired, but at first they are not especially agreeable. Large quantities are imported every year. The consumption in New York is large, partly by reason of the cosmopolitan population. The olive-tree is indissolubly con-

nected with sacred history. The Mount of Olives is a name as familiar as that of Jerusalem. The tree itself is so hardy that the olives now standing in what is termed the Garden of Gethsemane at Jerusalem are alleged to be identical with those named in tax-rolls as existing a thousand years ago, and there is a tradition—regarded by many as not altogether improbable—which makes them date back to the time of Christ. The tradition as to the extreme longevity of these trees still to be seen in the neatly-kept Garden of Gethsemane, and carefully watched by a sacred Order, is undoubtedly based on the well-known fact that the olive-tree is the hardiest fruit tree that grows. It survives the severest frosts, even sharp scorching by fire, and almost any degree of mutilation. It sprouts from the roots if everything else is dead. It is known to survive for centuries after the heart and all but the outer layer of young wood are gone. Often a large trunk is not only hollow, but split lengthwise into several distinct stems, all healthy and bearing fruit. Olive oil was known to the writers of the Old Testament, in whose time it was used for sacrificial libations, for illumination, for food, and for anointing the hair and body. Homer mentions the olive-tree. It was conspicuous in Roman agricultural literature. The Romans used olive oil in the kitchen and at the table, instead of butter, which was scarcely used in the Roman *cuisine*.

In Palestine, and in some of the Mediterranean islands, the olive tree is as lofty as the tallest oak, but in Europe it does not often exceed twenty feet in height, being kept down by pruning for the sake of convenience in gathering the fruit. It grows in Asia-Minor, Syria, Northern Africa, Southern Europe, the Greek Islands, Spain, Portugal, France, Italy, California, and even to some extent in the Crimea. Olive trees are planted from fifteen to twenty-five feet apart, and with careful husbandry, will bear every year. Italy produces an enormous supply of olives and olive oil, and the crop in California is steadily increasing. The olives are gathered when fully grown but still green; they are first steeped for a day in weak lime-water or lye of wood ashes; then in fresh water changed every day for four or five days, or until they have lost their bitter flavor. Then they are salted or pickled in a strong brine. This is the practice when the harvest is simply for the olives themselves. When it is for olive oil, the fruit is allowed to remain on the tree until it is of a dark wine color. Then the olives are dried a little, and then compressed for the oil. The best oil is from unground fruit, but it is also ground and subjected to repeated pressure, sometimes with the aid of hot water.

Olive oil is adulterated with lard oil and cotton-seed oil. There are large exports of the American oils mentioned, and

they come back from Europe, notably from Marseilles, traveling under the disguise of the best oil of Italy or Provence, really being largely an extract of American lard and cotton-seed, which unscrupulous French and Italian merchants foist upon us with smirking complacency. In the fiscal year ending June 30, 1887, no less than 744,766 gallons of olive oil, valued at \$662,197, were imported into the United States, mostly at New York. Olives and olive oil come to this port in the English, French and Italian steamers.

The total importations of spices into the United States in the fiscal year ended June 30th, 1887, were 30,980,725 pounds, valued at \$3,481,412. Pepper is the most extensively used of any of these spices known to commerce, and nearly \$2,000,000 worth is consumed in this country every year. Spices are admitted free of duty except when ground.

But it is well known that spices are much adulterated. Burnt crackers, buckwheat and ground cocoa-shells are used to adulterate pepper. Ground almond-shells are mixed with cassia and cinnamon. Flour is mixed with mace. Meal and starch help to make full weight and good measure of ginger. Pimento is too cheap to make adulteration profitable. Nutmegs have never been adulterated except in Connecticut, where a very successful imitation is said to have been made many years ago by some of the thrifty deacons who happened to keep country stores.

There are no wooden nutmegs now in market. Cloves are adulterated with clove-stems, which are very cheap. At one time they cost only one and a-half cents a pound at wholesale. Mustard is adulterated with flour and tumeric, which is yellow in color, and gives it its pungent taste. Tumeric itself is the root of a plant found in the East Indies and in Cochin China. It is sold in the form of dried root or powder, and besides being used so extensively in coloring mustard, it is employed in the dyeing of silks and wool, as well as in medicine and chemical analyses. As originally used in Europe, mustard was simply the finely ground seed, but in time a demand arose for an improved yellow color, the natural tint being rather dull and unattractive, and then the flour of mustard was introduced, this merely being the interior portion of the seed, the bran being rejected as in the case of wheat in making flour. The result was a loss of the pungent taste peculiar to mustard, which is largely due to the presence of a bitterish oil in the husk of the seed, and to supply this deficiency the next step was to introduce tumeric, Cayenne pepper and other foreign ingredients, with wheat flour to increase the bulk and lightness of color. There is little or no pure mustard to be had anywhere; it is practically a druggist's compound, and in New York mustard-seed is sold by drug brokers.

But the shipping element of the mighty commerce of New York is always more interesting than its formal array of statistics. Here at a wharf on the East River, near old Rutgers Slip, is a ship with big tan-colored spars and a brave array of rigging, pulleys, ratlines, cordage, chains and white decks. Her sides are barked and rusty with the long voyage from Hong Kong. A companionway is lowered to the wharf, and a notice close by announces that there is no admittance to the ship, though this warning is but slightly regarded. A queer little floating house on one side of the ship contains the steam winch, by which the cargo is hoisted from the depths of the sombre hold to a slanting skid, down which the merchandise is sent to a platform supported by wooden horses. From this platform the men take the bales of rich goods and pile them up, according to their marks, further along the wharf, or else put them on trucks to be taken to various parts of the city. On the dusty and splintered wharf are bales of cassia, bags of ginger, boxes of preserves, chinaware, rattans and curios, bales of straw braid and rolls of matting, bearing such labels as "Kee Ning," "Hong Kong Fancy" and "Mandarin," packed in bales of native grass. There are boxes of soys, a kind of sauce or flavoring made in China from a small native bean; there are cases of lacquerware, such as cups, saucers, trays, pots and dishes. The cargo contains no less than 500 cases of native preserves, and nearly 5,000 pounds of ginger. There is chinaware consigned to a Chinese firm in New York, Lin, Fong & Co., besides rattan chairs. In all, the big ship will yield up more than 18,000 rolls of the matting, which is so much neater and better than carpets for certain rooms of the dwelling, and so much superior to the cheaper carpets or the chilling oilcloth for halls. Big red trucks are being loaded with this merchandise from the far East, and every few minutes a team of stout horses, with flanks and harness glistening in the afternoon sun, rumble along the wharf out into noisy South street, where the stout-lunged driver is speedily reveling in a wordy and profane warfare with the driver of a horsecar, whose observations on the truckman's parentage, physical appearance and mental characteristics call forth a vituperative deluge in response from that maligned but fluent individual. Truckmen, as a class, are probably the same all the world over, as profane and abusive at times as parrots with a bad "bringing up."

Most of the steamers in the East Indian trade take their cargoes to London or Liverpool, and consignments for America are there transhipped in the regular steamers plying to New York. A new line of steamers between New York and Calcutta was established some months ago, and cargoes of East Indian merchandise are now more frequently brought hither direct. Some of these steamers also go to Bombay, Madras and

Colombo, in Ceylon. They bring cinnamon, ginger, coffee, indigo, jute, cinchona bark and other products. Seven steamers of 4,000 tons each are in the trade. They usually make the trip from Calcutta to New York in about thirty-five days, though occasionally it takes longer. The steamers have a great advantage in this trade, as they always go and come by way of the Suez Canal, that wonderful engineering feat that connects the Red Sea with the Mediterranean, whereas the sailing vessels, by reason of the high tolls on the canal, are obliged to go around by the Cape of Good Hope—certainly a commercial misnomer in this case. Every Anchor Line steamer pays four hundred pounds sterling, or two thousand dollars, to go through to India, and the same amount coming back, making four thousand dollars in canal tolls for the round trip. The famous Peninsula and Oriental pay even more—four thousand dollars each way.

“There is one interesting fact about the spice trade,” said a large importer, “and that is, the consumption of spices is increasing in this country out of all proportion to the increase of population. This is true not only of the staple spices, but of all kinds of fancy condiments. The increasing wealth of the country accounts for the enormous demand. Another thing: it would be a very important matter to us if the Prohibitionists should be more generally successful. In States where the Prohibitionists have the strongest hold, it is a curious fact that the consumption of spices is proportionately the largest. There is a certain class of persons who are determined to have some to warm them up.”—*Frank Leslie's Popular Monthly.*

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THE LAND QUESTION IN HAWAII.

[An Essay read before the Social Science Club of Honolulu, in 1886, by Hon. W. R. Castle.]

The proposition to place the great landed properties of Honouliuli, Kahuku, and Kawaihoa, on the Island of Oahu, in the hands of a company for colonization purposes has induced considerable discussion upon the possibility of procuring good land, in small lots, in this country. It will hardly be denied that the presence of a large number of small landed proprietors is a healthy condition for any country. But such is not the condition here. It is true that the number of kuleanas is quite large—somewhat exceeding 11,000; but these holdings are almost uniformly very small, seldom exceeding two or three acres in extent, and generally cut up into two or three, and, in the cases of larger kuleanas, five or six little parcels.

With the limited requirements of the Hawaiian in former years, these kuleanas were quite sufficient for the necessities

of the family, taken in connection with the privilege accorded the tenant of fishing in the sea adjoining the chiefs' lands, and taking firewood, building material, cord, and such needs from the adjoining holding. These little farms, to dignify them by that term, would be quite insufficient for the needs of a more extended civilization and the wants of European races. The probable extinction of the Hawaiian people compels us to consider who are to follow them as the population of these islands. Already the native race has become less than one-half of the whole number, and the total of to-day is far less than the capacity of the land to support.

The gross area of the country somewhat exceeds that of the United States of Connecticut and Rhode Island. The Island of Hawaii is not quite the size of the State of Connecticut. None of the other islands equal the area of any State—or, indeed, of any one of the hundreds of counties in the United States. When a comparison is instituted between the Islands and those two States as to the number of acres of arable land, the disparity is very great.

The total acreage of the Islands is about 4,293,600; that of those two States is 3,993,000. But while it is doubtful whether more than one-fifth of the island land could be cultivated, the above-named States have over two millions acres in farms.

The almost total absence of figures renders it impossible to give a correct statement of the lands of the Islands. The nearest approximation is to recite in brief something of the history of land titles.

Under Kamehameha I., perhaps before him, and till the great division of 1848, the lands of the Islands were held under a tenure very similar to the feudal system of England, excepting perhaps that no one but the King could ever assert an absolute title. However, during the years from 1820 to 1848 the chiefs exercised rights which probably even the King would not dare to dispute. In that year occurred the great partition, or *mahele*, of the lands—a proceeding which comparatively few at the present day understand.

It was an act which sheds lasting glory upon the name of Kamehameha III., for by it he at one stroke unlocked the lands of the Kingdom from the declining embrace of a feudal system, and placed them within the limits of free use and alienation. It was an act at once creditable to that King's sense of justice, to his discernment in recognizing the changed conditions of the country, and to his desire to advance the real interests of his people. The Board of Commissioners to Quiet Land Titles was in existence at that time; but had it not been for that act, it is doubtful whether their work would have been final. The nature of the *Mahele* and its theory are set forth in Rules 1 and 2 of the Resolution of the Privy

Council of December 1847, which recognize first that the King was entitled to retain all of his lands, subject only to tenants' rights; and second, that the remaining land of the Kingdom should pertain in equal third-parts to the Government, the chiefs, and the common people. Then followed the great division whereby the chiefs released to the King the greater portion of their lands in exchange for his release to them of his claim as superior lord in the remaining portion.

Immediately following this the King, by a deed March 8, 1848, reserving to himself certain lands, conveyed the far greater portion to the people as Government lands. As suggested by Professor Alexander in his report to the Minister of the Interior for 1882, pages 15 and 16, he seemed to recognize a claim of the Government in his own lands. His deed was confirmed by Act of the Legislature of June 7th, 1848. This Act is set forth in full in the Civil Code, and names 138 lands, ahupuaas and ilis reserved by the King, and about 775 lands made over to the people, besides 52 lands called Fort lands, which, in fact, constituted a part of the public domain, making a list of about 827 lands.

These lists, together with the chiefs' lands set forth in the Mahele of 1848, should constitute the entire number in the country; but, in fact, there are about one hundred and eighteen lands not mentioned or covered by any list, and the question of ownership is to-day an open one, yet to be decided by the Courts, and they contain probably not far from 250,000 acres.

The work of the Board of Commissioners to Quiet Land Titles, which expired by law in 1855, covered not only claims arising under the Mahele and attendant Acts, but also all claims arising prior to that time under deeds, leases, and other conveyances from the chiefs and King in earlier days. The Constitution of 1840 recognizes rights in land, and, by evident implication, ratifies and confirms those rights, so that title may some time be claimed under that Act.

The total number of claims presented to this Board amounted to 11,309; but, as all of these were not confirmed by awards, some, under the law, reverted to the Government. Surprising as it may appear, careful and accurate statistics as to the lands of the Kingdom are wanting, and no one can tell without a careful count how many awards were actually made. In the same way no one knows, nor can it be ascertained exactly, how many acres have been conveyed by these awards.

It would seem at first blush that one might take the Index of Awards and figure it out, but when it is remembered that a large number of awards for whole ahupuaas were made by name only, this impossibility is readily seen.

After the great settlement of 1848, the Government rushed into the market and by land agents all over the country, some

of whom were appointed as early as 1847, proceeded to sell off the Government lands. For these sales, grants were issued, which have a different series of numbers from the Royal Patents issued on Land Commission Awards; of the latter class there are now 7,793, while the Royal Patents issued on Government land sales number 3,386. No one knows how much land has been sold from the Government domain. There is not even an official record of this. It is not so strange that no one knows to-day how much land the Government still has, for the lands of the country were never systematically surveyed and located. The work of surveyors in the early days, was to ascertain with all possible dispatch, the amount and locality of the kuleana of the native, or the town lot of the foreigner, and following this to lay off tracts of Government land for sale. The consequence of this absence of any plan or system was, that when called upon to locate different lands and their sub-divisions in relation to each other, the surveyor or engineer is often at a loss to know how to put them together. It is about as if one were to make a dissected map of the United States by whittling out a number of slabs of wood by guess as to each State, and then trying to put them together. Those who have had any experience in land matters here, will thoroughly appreciate this, and can fully sympathize with those whose duty it is to put together the surveys of such a district as Waikiki, for instance, with 500 to 600 different lots.

It must not be understood, however, that things remain in this crude condition. In 1868 the survey department was instituted and has done a vast amount of work. So far, a large part of its force and time has been spent in reducing the work before it to a system, and wonders have been accomplished.

It cannot be said now exactly how many acres are covered by the kuleana holdings, but allowing an average of two and one-half acres for each, omitting the somewhat larger awards, the hulumanu class, and the ahupuaas and ilis, probably 25,000 acres would be sufficient.

The Government has sold away the great bulk of its lands, and now have somewhere in the neighborhood of 655,000 acres, a large part of which is mountain and forest land, much of which ought never to be disposed of.

The Crown lands now remaining (much was sold by Kamehameha III. and IV.) compose about one-fifth part of the entire Kingdom. There are now about 135 to 140 lands, and their approximate area is, say 900,000 acres, of which about 586,000 are on the island of Hawaii—truly a splendid property.

The large estates of former years, belonging to the chiefs, have by sales, death and otherwise, dwindled down to very few in number; notably the great estate of Mrs. Bernice Pauahi Bishop, lately deceased; that of the Parkers on Hawaii, and

of James Campbell on Oahu, with some others. These estates produce large incomes and make their rich owners the richer if properly managed, and it is safe to assume that the properties above mentioned are well conducted.

The kuleanas of the country are too small for the requirements of civilized life, but if the land fit for cultivation could sustain a population of 400,000 to 500,000, a hundred years ago, the same land with far wider possibilities, can do as much to-day.

We shall never, under present conditions, raise our flour, but we can raise a variety of products which can be converted into flour. We can produce kalo sufficient for all the possible needs of the country, so with potatoes and other vegetables. It is true that the area of arable land is small as compared with the total, but it does not, therefore, follow that all of the rest of the land is useless. An area greater far than the arable soil is not only suitable for, but furnishes excellent pasturage. A vast amount of land now held to be worthless is, or can be covered with forest. The introduction of hitherto untried industries will greatly expand the capacity of the islands to support population, if for no other reason, because it will permit the utilization of unproductive tracts.

No doubt the cinchona will do well, so with several varieties of useful palms, the Manila banana, ramie and other fibre producing plants; various kinds of millet, which are said to furnish food for about one-fourth of the human race, and some others, besides some oil producing plants. The vine promises well, coffee is successful, and several spice producing plants can be grown. All of these things can be made to produce income and will help to support a population of many times what we now have.

Of course, there are those who have had some experience in growing fruit and other products, who will at once and promptly declare that coffee, fruit growing and other industries have been tried and are failures. It is true that oranges, limes, the vine, coffee and other products have many enemies here.

The blight, bugs, drought and other things conspire to defeat the husbandman's efforts, but perhaps, no more here than in other countries. Coffee culture has become a pronounced success in Ceylon. The valuation of the industry has reached the enormous figures of over £11,300,000, or about \$56,500,000, yet the industry is only about forty years old. It was thought in the early days that the project was an utter failure, for many crops were lost and whole plantations destroyed by blight, drought and other causes. The number of insect pests, parasites and vermin fatal—in time to coffee in Ceylon, which have been identified and classed, is about forty-six. This takes no account of furious winds, drought, etc.

It is constantly necessary to use manures, and besides the vast quantity there made and used, imports to the amount of nearly \$400,000 annually are made.

Surely, coffee in Hawaii is worth trying, in view of its success in Ceylon! We cannot expect to live and grow rich forever on the unassisted prodigality of nature.

Small farms are essential to the best and most stable population. They are as practicable here as in any other part of the world. Just so long as the country is cut up into a few great plantations and grazing ranges, owned or controlled by a small number of individuals or corporations, and the land is cultivated and occupied by a population with no interest in the soil, and obtaining nothing therefrom but wages, may it be expected that Hawaii's progress will be slow? We cannot expect a permanent population of high character under these conditions.

It will inevitably become and remain servile and dependant. An intelligent gentleman in one of these islands owns or controls land enough to keep under cultivation a farm of twenty or thirty acres of cane. He uses horse-plows, employs extra help several times in a year, making, as he says, an average of about one man besides himself the year round. He cuts his cane, and it is taken from the field by the mill which makes his sugar, and returns him something over one-third of the product. By regular and careful cultivation, his land produces about three tons of sugar to the acre. His share amounts to twenty to thirty tons each crop, and has in former years returned him from \$3,000 to \$4,000 per annum, on which, after paying cost of production and taxes, he lives comfortably with his family, consisting of a wife and two or three children, and saves a little each year.

This is a poor show for a good many of our people, who came here to grow rich, but for the interests of the country it is of incalculable value. It shows what can be done in the way of small farming—at least in sugar-cane. But there is no doubt that the same results will attend other branches of agricultural enterprise. It only needs intelligent experiment and practical men to take hold. Compare the dairy business of Honolulu to-day with our milk supply ten years, or even five years, ago. The same number of cattle from the same land produce double and treble results, at greater expense of course, but with better returns.

Banana cultivation pays the Chinese and Portuguese, who are now engaged in it. No doubt, by skillful treatment, it can be made to pay others. Mr. Lycan, of Kalihi, has now in part succeeded, after some years of experiment in so planting, urging or retarding growths, as to ripen the greater part of the banana harvest between the months of December and June,

the period when that fruit commands the highest price in the California market, when local fruits are out of season. An acre of bananas will produce each year from 600 to 700 bunches, and during those months they will readily net here half a dollar a bunch. Pineapples grown by the same person, and sent to California, returned from \$3 to \$5 per dozen, and he has now set out several thousand plants, with the expectation of shipping to San Francisco. What Bermuda and some of the West India Islands are to New York, these Islands may become to San Francisco and the Pacific Coast.

But in order to have our community of small farmers, land must be had either on long and reasonable leaseholds or in fee. In India, while it has been the aim of the British Government to establish private property in the soil, yet the revenue system, which consists of a fixed charge per annum upon the land, virtually vests the ownership in the Government. But the proprietor has, after the payment of this charge, almost as unlimited right of alienation as exists in the United States. The system has been one of the causes of the great increase in the prosperity of that empire. It has encouraged the cultivation of the soil. It has induced the making of great improvements in part by the Government, in part by private enterprise.

Vast portions of India are susceptible of cultivation only by irrigation. In the province of Sind, where the annual rainfall averages only about ten inches, it is said that all of its 3,000,000 acres of cultivated land is irrigated. This is done in part by irrigation canals leading from the river, but by far the most is from artificial reservoirs where the rainfall is collected and stored.

The history of irrigation in California is so well known that nothing need be said of that except to call attention to the great area of land brought up from a worthless condition to that of great and permanent value.

The system of sharing profits between the landowner and cultivator is pretty well known here, but, as compared with the system in many other places, it is extremely crude and unsatisfactory. Here the engagements are for so short a time, as a rule, and so capricious as to terms, that they are extremely unsatisfactory, and tend rather to discourage than encourage settlement. In many places the cultivator requires something of permanency in right of occupations, and a share of the burdens of the land are upon the landowner, as for permanent improvements, etc.

We have seen that the Government can furnish but little land for settlers. Of its possible 655,000 acres, with another possible 250,000, or in all not much, if any, over 900,000 acres, considerably over one-half is barren mountain or forest land. Of the remainder a large part consists of fragments here and

there, many of them too small for farming purposes. It is, however, probable that farms enough could be carved out of these Government lands for 800 to 1,000 small holdings, say of 25 to 150 acres each. Here alone would be an element of stability and of wealth which would be felt at once in the community. The Crown lands might furnish a most important factor in this matter. Either they could be turned over to the Government and made available for settlement, in lieu whereof a fixed or movable annual stipend depending on values, etc., could be paid to the King; or by proper management, with long and reasonable leases, they could be settled in small tracts.

At present, and with the existing system, or lack of system rather, or control, they are of no value for immigration purposes, except as means of extorting the most amazing rents from Chinese and natives. The only remaining source whence assistance for immigration and colonization can be looked for is to the large landed proprietors of the country.

The Honouliuli project is now prominently before the public. Its details need not be rehearsed, but if it can be successfully carried out, besides adding largely to the wealth of the country, it will settle something concerning the value of such lands. This plan has the advantage of dealing with compact blocks of land, and a comprehensive system of irrigation from storage reservoirs can be undertaken whereby the waste rainfall will be utilized. Perhaps no other landowner in the country has the opportunity for this system of inducing settlers equal to that enjoyed by the Trustees of the Kamehameha Schools, who have at their command more land than any others, except the Government and Crown lands.

If landowners do not wish to part with the fee in their estates, they can, by a comprehensive and judicious management, settle upon a fixed income by a system of long leases at low rentals, or become partners in a sense with tenants who might be allowed to obtain rights in the soil so long as the property was properly managed and husbanded, the landlord bearing the expense, or a part at least, of permanent improvements.

The subject unfolds, and might be treated of in detail to great advantage; but the object of this essay is to give a general outline, not to enter into exhaustive and comparative particulars. But it is believed that, if in accordance with suggestions here thrown out, or in any other of many plans which might be proposed, the grand object could be secured of obtaining and keeping a higher class of immigrants, who would become permanent residents, tempted by a genial climate and a generous nature, a future would open for Hawaii compared with which her brightest days in former years would seem as dark and drear.

SUGAR MAKING IN ARIZONA.

PHOENIX, A. T., August 30, 1888.

Enclosed with this, you will find an article on the visit of Mr. Lucius Forsyth, of your State, to this place. I may add that we have full faith that the growth of sugar here successfully in commercial quantities, will be accomplished soon, and any effort that the sugar planters of your State may desire to make here, will be met more than half way with encouragement. There are 1,000,000 acres of land of alluvial and volcanic deposit, very closely resembling the soil of the Sandwich Islands, and it being irrigated, there is no reason why the high result of the islands should not be obtained here. Our cane grows well, and will make a tassel every year as result happening in the best sugar years in Louisiana, I am informed.

Sugar is very high here—\$8.75 per 100 pounds, wholesale, with a tributary market—and at least 40,000 people that might be said to be the local trade of this place, should sugar be manufactured here.

Of the climate: Oranges and dates grow well in the open air, and fruit excellently. Figs are a regular crop, and bananas have fruited successfully. The air is very dry, average rainfall being seven inches. There are no chills and fever or malaria.

People here would like to see experienced planters from the sugar districts undertake this crop here, believing with experience and good management, large profits might be made.

Very truly,
L. FOWLER.

The following is the article referred to by our correspondent, copied from the *Arizona Herald*:

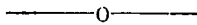
Phoenix had the honor of a call, a few days since, from Mr. Lucius Forsyth, Jr., of Louisiana, a practical sugar producer, whose forefathers have been in the same business for three generations, and of course, his whole life has been spent in the business in which he was brought up. Mr. Forsyth came here at the instance of the Sugar Planters' Association of Louisiana, to look up the prospects of the Salt river valley for that particular business, a duty that there is probably none more competent to perform than Mr. Forsyth, who is undoubtedly one of the best and most systematically posted of sugar men in the United States. Mr. Forsyth is the author of a number of important papers on sugar culture and manufacture, some of which have been reprinted as authority on those topics wherever sugar is grown or manufactured.

After a careful examination of this valley, and the cane already growing here, Mr. Forsyth, in a talk with a *Herald* reporter, made known his conclusions this far: That the conditions for sugar growing here are nearly identical with those of the Sandwich Islands, where irrigation is used, and where the

product of sugar per acre is much larger than in Louisiana; the yield of sugar in the Islands reaching 14,000 pounds per acre per annum, while in Louisiana the yield is from 1,800 to 3,500 pounds per acre per annum. He regards the soil and climate here as both more favorable for sugar making than in Louisiana, and believes that sugar can be produced here at a much less cost by irrigation than in Louisiana, where it is generally necessary to drain the sugar plantations at great expense, the planters often being obliged to pump to gain drainage. He thinks that thirty tons of cane per acre would be a low estimate here, and that the cane can be delivered at the mill at \$2.75 per ton—about what it costs in Louisiana, where the return often runs up to \$200 per acre to the cane producer.

He regards the regular Louisiana sugar-cane, of which there are nearly 200 varieties, as the cane to cultivate, and that probably it would be desirable to get our first stock of plants from the Sandwich Islands, as the cane is there produced under conditions so much like those here existing. Mr. Forsyth was so favorably impressed with the advantages he saw here for the successful production of sugar, that he will urge upon the Sugar Planters' Association the advisability of establishing an experimental plantation here at once, so that by next year the matter may be thoroughly and practically tested; and we are informed that a gentleman here has proposed to furnish \$5,000, to be put in with a like amount from the Sugar Planters' Association, to carry out the test project, while another party offers the free use of a section of land for two years for a sugar plantation.

Mr. Forsyth states that in Louisiana the planters cultivate and cut from one planting for about four years, and in the Sandwich Islands from seven to ten years, is the length of time a plantation will run before the planting needs to be rescued. The time a planting would probably run here, he thinks, would be much the same as on the Sandwich Islands.—*Sugar Bowl.*



NIGHT TRANSPLANTING.

It is claimed by some that trees, if transplanted at night, will do better than if reset in the day time. We know that the sun has an influence upon certain plants and flowers, but to what extent it affects trees is not definitely known.

A party who desired to ascertain whether or not there is any difference between daylight and night planting, transferred ten cherry trees while the same were in bloom, commencing at 4 o'clock in the afternoon and planting a tree every hour until 1 o'clock in the morning, and the result would

indicate that the dark hours are better for the work than the light. Those transplanted during the day shed their blossoms, producing little or no fruit, while those planted in the dark maintained their condition fully. He did the same with ten dwarf trees, after the fruit was one-third grown. Those transplanted during the day shed their fruit; those transplanted during the night perfected their crop, and showed no injury from having been removed. With each of these trees he removed some earth with the roots.—*American Farmer.*

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SUGAR IN THE UNITED STATES.

The Number of acres in the United States in the sugar cane crop in 1879 was 227,776. The number of hogsheads of sugar produced that year was 178,872, and the molassess yield was 16,573,273 gallons. Seven States contributed to the totals as follows :

| <i>States.</i> | <i>Area in crop,</i> | <i>Hhds. of sugar.</i> | <i>Gals. of molasses.</i> |
|---------------------|----------------------|------------------------|---------------------------|
| Alabama..... | 6,627 | 94 | 793,199 |
| Florida | 7,938 | 1,273 | 1,029,868 |
| Georgia..... | 15,053 | 601 | 1,565,784 |
| Louisiana..... | 181,592 | 171,706 | 11,696,248 |
| Mississippi..... | 4,555 | 18 | 536,625 |
| South Carolina..... | 1,787 | 229 | 138,944 |
| Texas..... | 10,224 | 4,951 | 810,605 |
| Total | 227,776 | 178,872 | 16,573,273 |

The acreage in sorghum is not given, and it would be manifestly absurd to reckon the acreage in maple sugar, but the yield of these products is given by States in the census of 1880 for the year 1879, and must be taken into account in the estimate of the sugar crop of the United States. Twenty-four States raised sorghum. Missouri, Tennessee, Illinois, Iowa and Indiana take the lead in the order named. The total for the year was : Sugar, 12,792 pounds ; molasses, 28,444,202 gallons. A good deal of progress has since been made in the granulation of sorghum, but the problem is still far from absolute and final solution. The maple sugar was raised in twenty-three States, Vermont leading all the rest, followed by New York. These two States raised more than half of the whole crop. The yield in 1879 was : Sugar, 36,576,061 pounds ; molasses, 1,796,048 gallons. It will be observed that sorghum furnishes more than half the molasses raised and that the yield of maple sugar is very considerable.

The maple requires no protection. It possesses a quality of its own which determines its market value independent of ordinary sugar ; but if protection were taken away from cane its production would cease, and if taken from sorghum its granulation would not be attempted.

To complete the information naturally going with the foregoing facts we give the consumption of sugar in the United States in 1879 and the imports and domestic supply, using the weight of 2,240 pounds to the ton. Total consumed 1889 743,174 tons; imported, 631,174; domestic, 112,000. The proportion now being imported is still larger. We imported over a million tons last year, or more than 2,240,000,000 pounds. With the secret of sorghum granulation without exceptionally large waste solved, the enormous drain upon our resources to pay for all that imported sugar would be saved. Its early solution undoubtedly depends upon the continuance of the protective policy, and the continuance of our cane sugar interest is a small matter in comparison with the importance of developing an industry that would secure saccharine independence to the United States.—*Inter Ocean.*

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*FRUIT AUCTIONS—DISPOSAL OF CALIFORNIA
FRUIT IN CHICAGO.*

“Well, what is your bid, gentlemen? What do I hear? Sixty? Sixty is bid—sixty, sixty. Sixty-three! Sixty-four! Sixty-five! Sixty-five is bid! Is that the best I am offered? Sixty-five! Do I hear seventy? Seventy it is. Seventy—seventy—seventy. Seventy dollars for forty crates of these choice nectarines. Seventy dollars.”

And the tall man with the voice of brass and the agility of a squirrel lets his eagle eye for one instant roam over the crowd of bidders. The survey satisfies him there is no more to be gotten for the particular lot he has on hand, and so he drawls out the familiar “going—going—gone,” and the lot is sold.

It is a very few minutes after 9 in the morning, and the auctioneer is of the firm of R. M. Montgomery & Co. He certainly must be an ornament to his profession, for his tongue is glib, his utterance piercing and rapid, and his instinct as to whether a higher figure might still be obtained from anyone in the crowd is unerring. Swiftly, lot by lot, the whole trainful of delicious California fruit finds takers, and Chicago, for one day longer, at least, is sure of her luscious dessert. What enormous quantities of this fruit have been disposed of, within less than an hour, to this crowd of about a hundred dealers and their agents! Cars on cars of it! Each car containing 20,000 pounds of fruit. Think of it! For one day's after-dinner relish Chicago requires a load of 100,000 pounds of fruit, grown 3,000 miles away by the shores of the Pacific, and hastened here on the wings of steam and across desert, and treeless prairie and trackless waste, and snow-capped mountains within a few days. There were sold here by auction last week, for instance, forty-two car-loads of this fruit, aggregating near 1,000,000 pounds.

Of course it is now the very height of the fruit season, and for another month this astonishing rate of dealings in California fruit will be maintained. Then it will begin to drop for another month, and by the middle of October the rush will be all over and done with for this year, until next May the cherries will again begin to arrive from that favored land which is blessed with "The glorious climate of Californy."

The scene where the fruit auction takes place every day is that far-stretching building on Kinzie street, between State and Dearborn, which is one of the freight depots of the Northwestern Railroad. The whole thing is an innovation. Acting under the instructions from the California Fruit Union, a body comprising nearly all of the important fruit-growers of that State, the Porter Brothers Company, a wealthy corporation of fruit-packers, of which James S. Watson, the secretary and treasurer, personally supervises the daily auction, began on June 21st last to hold every twenty-four hours these sales to the highest bidders of all the union fruit sent to Chicago, New York and Boston, and the experiment has admirably succeeded. The masses of California fruit which are daily thrown here on the market arrive generally in good condition. The fruit is packed in California with extreme care. It is then put in specially-constructed fruit cars, and a number of those are made up into a special fruit train. The train runs on regular passenger schedule time to this city, but ahead of the passenger train, so as to make the trip in four and a half days. What is sent are pears, peaches, nectarines, grapes, prunes, plums, apricots, and cherries. They are of all varieties, of course, some so good that they rank with the best fruit this terrestrial sphere produces, some middling, a good deal even of poor quality. Of peaches the smooth-skinned ones, honored with the appetizing name of nectarines, rank highest in price, flavor and favor. Of prunes and plums some new varieties are now coming into the market, and the same is true of the grapes. The fruit all comes in boxes and crates, each containing twenty or forty pounds. They are sold at auction in lots not smaller than twenty crates, except the peaches, for which the minimum quantity is forty crates. The sale is done at the entire and exclusive risk of the California Fruit Union, and the railroad companies merely act as carriers, being in any case—even if the contents of an entire fruit train should, perchance, become worthless—sure of their \$500 freight per car. For that large sum is the freight charge from California. But though it sounds very large, it is not so extravagant when one reflects that the \$500 are distributed on 20,000 pounds of contents, making a freightage of merely 2½ cents a pound of fruit—not a large item with this class of high-priced fruit. And yet it will, perhaps, be wrong to refer to California fruit hereafter as "high-priced," for this new ar-

rangement, with its effect of supplying the Eastern and central market with a steadily-flowing abundance has actually lowered the retail prices, and may reduce them still further in the future, while it has at the same time permitted the California fruit-growers to count with mathematical certitude on a fair cash return for their produce, for the transactions are strictly C. O. D. When a wholesaler in Chicago buys a car-load of California assorted fruit, he being the highest bidder, he pays spot cash for it, and the amount flows, facilitated by telegraph or mail advices, almost immediately into the pocket of the producer. Thus it will be seen that these auction fruit sales, being a good thing all round, have worked in every way beneficially to all concerned—producer, middleman and consumer.

“Chicago is now the greatest fruit market in the world,” said Mr. Watson, the ‘Porter Brothers’ Company representative. “Where we get fifty car-loads of this fruit here, they get but five in New York and Boston. These auction sales here are attended as well by agents for wholesalers from towns in a radius of hundreds of miles from Chicago, even by agents for New York and Boston parties. For it is a fact that California fruit bought by them here may be at once sent by express on to New York, and reach the market there sooner and in better condition than if forwarded direct by trains. And New Yorkers have ‘caught on’ to that fact, you see. Auction fruit sales, by the way, while new in Chicago, have been in vogue in New York for twenty years. The bulk of green fruit, which means fresh or undried fruit, imported into New York from the West Indies and the Mediterranean countries, has been sold at public auction for that length of time, and the system has been found to be the most satisfactory. Thus New York remains the greatest distributing center for bananas, pineapples, oranges, lemons, and nuts; but Chicago has become the greatest market for all other fruits, California as well as the rest, for every variety of berry and for tree fruit grown in our country. And the bulk of fruit thus distributed by Chicago is much larger than that of New York or Boston, or both together.”

Visits paid to the large fruit houses in South Water street about half an hour after the conclusion of the auction showed the latest arrivals of California fruit going like hot cakes, and it was wonderful to see how well the fruit, in nearly all instances, had stood the long transit. It looked as fresh and nice as if had just been picked off the tree. Boxes of grapes there were which did not show a single bruised berry. And it was the same with the pears and peach and prunes. The expert packing must have much to do with that, of course. The dealers all admitted that they found this California fruit a very profitable article to handle. Still, they claimed, with all the profit, there was considerable loss to it now and then.—*Chicago Herald.*

WHY WEIGH CANE?

Whereas it is now no longer the fashion, as formerly, to argue that the weighing of cane is without result, beyond the delay of team and cost of weighman, skepticism as to its benefits is still the rule, as is habitual weighing still the exception. This should be otherwise, and most earnestly, therefore would the *Planter* plead for the extension of a practice which has demonstrated its own value. For, all *a priori* considerations quite aside, nothing should be asked more conclusive in proof of the vast influence which cane scales can exert upon progress than the undeniable fact that generally with those who first and longest have weighed their crops has technical advance, both in field and factory, been most uniformly pronounced. It is a fact, also most significant, that among those who thus but once have passed an entire crop over the scales, scarcely one has abandoned the system, although some may have failed subsequently to learn computation, co-ordination and discussion of results might have been made to teach.

As with the appearance of quantitative methods, inductively applied, the magnificent, material impulse of this century was first felt, so with the introduction of this practice into the realm of modern sugar production, here and elsewhere, may it be said, substantial progress began its rise. If, before this event, the five-roller mill, the Rillieux multiple-effect and vacuum strike-pan were indeed sparingly utilized in Louisiana, the value of these remained problematical, so that numbers of them were actually discarded, and their introduction greatly delayed. With scales came intensive agriculture also, and proof of its efficacy and of phosphatic fertilizers.

It is not to be overlooked by those who still refrain from weighing that whatever exact knowledge of industrial practice they possess, in their chosen calling, has been acquired through others, who abstain neither from weighing nor from generous publication of their conclusions.

Knowledge confers power! In our sugar agriculture and our sugar manufacture alike both begin at the cane scales. Here, in the weight of raw material produced by the one and to be consumed by the other, resides the very keystone of criterion which, midway the arch, must lend common and equal support to our agriculture on the one side and to our manufacture on the other if the structure which has been reared upon these is not expected to succumb under the combined loads of European skill and tropical fecundity.

The relative value of various soils or varieties of cane, with their varying needs; the comparative merits of different fertilizers, differently applied; of different methods and times of cultivation, or of methods in drainage, and the best means of

ameliorating any among these, can be determined in no special case without the respective weights produced are ascertained. Without these last, efforts at improvement may end in unsuspected retrogression.

Again, except for these methods, work in manufacture must be performed in ignorance. In any individual case the chances are infinite for bad performance, while the actual result is left to guess-work, and the probability is infinitesimal for important improvement before knowledge is obtained that bad work exists.

It should be needless to expatiate further upon a matter so axiomatic as the necessity for exact quantitative methods to success in a business so complicated, and with competition so relentless—a knowledge specialized to meet the conditions, intrinsic and extrinsic, of each one's own environment. For it is clear that here, in greater part, the knowledge of one cannot be made the knowledge of all until the conditions surrounding all can be formed to a single pattern. Acquaintance with one's own alone permits comparison with the attainments of others. No one can afford ignorance of his own nor of his neighbor's results who, upon adjoining and similar properties, may perchance habitually secure the one only heavy tonnage of sweet canes, the other only relatively excellent yields of high grade sugar. Many, no doubt, at present persist in manufacture who, could they realize their error, would find profit instead of loss by the sale of their canes. Many, perhaps, produce cane largely who might more cheaply buy it. The skill of each might thus often be made the gain of both.

It is then more than selfish—it is most unwise—that any should await the elaboration and crystalization of general formulæ from the efforts of others, which must, in great part, still remain inapplicable to the individual special needs.

Weighing may be made a check upon everybody and everything entering as factors into the production and the harvesting of a sugar crop—upon the field-manager and his work; upon the teamsters and teams who supply, and the engineer and mill which receive the cane; upon the very character of the economy, wise or otherwise, which determines upon which side of the sheet, many times, the balance is at last to stand. It hastens the dawn of each day's work; it accelerates the movement of everything intelligent in the fields; it screws down the mill; it closes the gates which lead to the ditches; it brings careful watchfulness and prolonged endeavor, and renders good management more possible; it may discover early in the day blunders which must otherwise run out their course, and it lends to hard work the interest and invigorating exhilaration of friendly rivalry with others.

Weighing is a satisfaction. Success, demonstrated, affords

keenest pleasure, offers incentive to renewed effort. Failure, recognized, makes clear the necessity for better things and spurs on to the same end. Having done all, it is satisfaction to know that this, being unnecessary, can for the future be at least in considerable part avoided.

Weighing is the beginning, if it is not the end, to ascertained results, without which final failure is probable. It should be applied not alone to mill cane, but to seed as well. Juice also should be weighed as regularly and as carefully as the sugar itself, to test the extraction as well as the production. Coal consumed, and even corn as housed, and hay when harvested and fed, should not, of a right, escape this tell-tale operation, which, compulsory by law, has played a part in extending and perfecting German beet sugar production, scarcely second to German intelligence and pertinacity.

Weighing is the necessary beginning which will rapidly draw into its wake the accurate survey and platting of lands, the polariscope and burette, and with these the application of exact and intensive methods under scientific surveillance to every department of the business. Such is its importance that it may be safely said of any sugar farm too small to afford scales that is far too diminutive to afford factory plant, as it will yet surely come some day to be assumed of any factory too unimportant to warrant its chemical laboratory that it is too weak longer to survive.

The *Planter* may often, and in many ways, revert in the future, whether directly or indirectly, to this vital matter and its cognates. In the meantime it earnestly solicits of all the most careful analysis of its views, and the most searching and frank criticism of its position in this regard. If there really be two serious sides to the question of expediency here involved, both should be duly and immediately ventilated. The *Planter* in the meanwhile stands prepared, as champion of the cane scale, to break lances in any tourney which develops.—*The Louisiana Planter and Sugar Manufacturer.*

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SUGAR IN FLORIDA.

Judge Kelley has received a letter from a New Orleans gentleman in reference to the production of sugar in this country, in which the writer says: "Mr. Disston and other capitalists have organized a large stock company at St. Cloud, Osceola county, Florida, for the purpose of cultivating sugar cane and manufacturing therefrom sugar of the highest grade, equal to the best granulated sugar of any of our best refineries. The company is now erecting an immense sugarhouse and equipping it with the best and most modern apparatus. They will grind this fall 600 acres of excellent cane, with an average of

thirty tons to the acre, equal to about 18,000 to 20,000 tons. As the cane will yield 150 to 160 pounds to the ton, the output of that factory will reach, beyond a doubt, from 2,700,000 to 3,200,000 pounds of the finest sugar. As Florida contains millions of acres of the finest sugar land in the United States, already drained and ready for cultivation, I do not hesitate to say that Florida, in five or ten years will turn out more refined sugar than any State of the Union. As to the number of pounds of sugar per ton or per acre, Florida will excel any State, and become a dangerous rival to Cuba. I think that Louisiana, Florida, Texas and Kansas will soon be able to supply us with all the refined sugar we can consume."

SUGAR CULTURE IN THE UNITED STATES.

Statements having appeared in several journals to the effect that Dr. Wiley, the Government chemist—had pronounced sorghum culture and sugar a failure, he has, under date of August 17, published a letter in which he says, this is "an entire misapprehension of his position." He adds: "Sorghum at present, is far inferior to sugar cane and the sugar beet as a sugar producer. In certain circumstances sorghum develops a sugar-producing power which entitles it to rank with the two plants mentioned. By wise selection and culture, the sugar producing power of sorghum may be increased. Over large areas, especially in Kansas, the sorghum sugar industry has now a fair prospect of success. In regard to the quantity of sugar which, by diffusion, may be made from each ton of cane of the quality grown at Fort Scott last year, I quote from page 16 of *Bulletin* 18th: 'This yield, with such cane as mentioned, will be 4 to 4½ per cent. on the weight of clean cane.' If this average yield can be secured with the cane now we need have no fear of the future."

REMEDY FOR MOSQUITOES AND FLIES.—Many persons are very much troubled with these pests—especially those living in warm districts. Allow me to present you with a certain cure, obtainable by all at a very little expense. Make a solution of common saltpetre, nitrate of potash—say 1 oz. to a pint of boiling water (or vinegar and water), which is better). Soak pieces of brown paper (thick) in it; then dry the paper. Put a piece when dry upon a tin plate, sprinkle it well over with insect powder, and then light one corner of the paper, which will burn the insect powder as well as itself. The fumes will destroy all insect life, and is quite innocuous to the youngest infant in the room. This has been tried, and never known to fail, and is given by the writer for the benefit of those who was troubled like he was before it was discovered.