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Latest advices quote Cuban centrifugals, 96 deg. test, in New York at 3 $\frac{2}{3}$ cts. on the 9th of November.

The annual meeting of the Planters Association will open at ten o'clock of Monday, November 25th, at the rooms of the association, in the Robinson block, corner of Nuuanu and King streets.

A noted legal authority says: "Suffrage is not a right to anybody. It is a privilege granted by the Constitution to such persons as the framers of the Constitution and the founders of the Government deem best."

The ship *S. P. Hitchcock*, which sailed from this port Nov. 7, for New York, took 7,113,168 pounds or 3556 1116-2000 tons of dark sugars. This will probably be the last shipment this year of dark sugars from this port for New York.

The chief peril, says Dr. Henry C. M'Cook which threatens the United States today is legalized lawlessness. Every educated man and woman is under heavy bonds to God and

law and duty to enter the ranks and do battle therein until our cities and commonwealths are redeemed.

The exports of sugar from these islands, shipped chiefly to the United States, from July 1 to September 30, 1895, amounted to 22,594,534 pounds, valued at \$608,309.96. The exports of sugar for nine months, from January 1 to September 30, 1895, have amounted to 268,395,718 pounds.

The following, from an address of Cardinal Gibbons, is applicable to the mechanic's shop as to the field or factory: "I am for a quiet and decent observance of the Sabbath as a day of rest and recreation. Man needs one day in seven in which to recover from the fatigue of the other six."

Husbandary is the first born, but it is not the most favored trade, because farmers cannot live in the towns, and consequently they have not much influence in making the laws. We must stand shoulder to shoulder against the drones who govern us and who produce nothing but laws.—*Prince Bismark.*

The profits of the 84 beet sugar factories in Russia are stated to have been as follows: three returned our fifty per cent profit; seven between 40 and 50 per cent; 17 between 30 and 40 per cent; 19 between 20 and 30 per cent; 18 between 10 and 20 per cent; 17 were under ten per cent; and only three report a loss.

If the ex-Confederates who carried the stars and stripes at the head of the Grand Army procession at Louisville had been told thirty years ago that they would do such a thing they would have considered it a reflection on their patriotism. But history will record this as one of the most patriotic acts of their lives.—*Exchange.*

Twenty years ago the forest area of the United State amounted to 760,000,000 acres. Ten years later there were left but 620,000,000 acres, while this year 1895 there can be measured up in the entire country not more than 410,000,000

acres, and the destruction is is going on at the rare of 27,500 acres a day.—*Exchange.*

Pineapple culture has been tried in the Cahuerga Valley, California, by a Mr. Rapp, but on the whole it has not been a success. The plants do not perish, but dwindle along in a hap-hazard sort of way, failing to perfect their fruit. It is doubtful if pines can even be produced in an amateur sort of way in open culture in any section of California.—*Exchange.*

The Watsonville (Cal.) Beet Sugar factory is now handling daily the enormous output of 1000 tons of beets per day, and the entire crop will be boiled down by the end of December. The crop will be under 100,000 tons of beets, and not far from 12,000 tons of dark sugars, all of which are sent by rail to the San Francisco Refinery, there to be treated as our island sugars are.

Drinking water is better when boiled, whether taken from a river, a surface spring or well, or an artesian well, even though it may appear to be clear. At times, water derived from either of these sources is discolored or muddy. Even artesian water sometimes becomes so, after a hard rain, showing that the rain water has gained access to the artesian source, hundreds of feet below the surface.

It is certainly a credit to the Hawaiian Government to have its six per cent. bonds quoted in the London market at 102 @ 103, which was the quotation at the latest advices. Some American bonds which might be named, do not make as good a showing there. In San Francisco the quotation is par, the difference being about the same as that of bank discounts between the two cities.

The sails of the yacht *Defender*, which kept the American cup from being taken back to England, were made from a mixture of ramie and cotton, both were products of the Southern States, the former grown and cleaned in Louisiana, and the latter in Georgia, but manufactured in Massachusetts. It was the first attempt to make sails from ramie, and

the successful experiment was made at the suggestion of the Herreshoffs, who were the builders of the *Defender*.

RICE IN TEXAS.—At the present rate of increase in rice culture in Texas and Louisiana, these two States will soon produce rice sufficient to supply the United States, as well as a part of the old world. Southeast Texas is rapidly developing into a first-class rice growing section. This fact has caused lands in that locality to jump from \$1 to \$2.50 per acre to \$10 and \$20 per acre within the short space of three years.—*Texas Immigrant*.

Latest advices from both the United States and England report that Mr. Dillingham's plan of establishing a new plantation at Ewa, to be called the Oahu Sugar Plantation, is meeting with increased favor by foreign capitalists. It is a bold and gigantic project; but those who are most conversant with the possibilities of this enterprise, are confident that it will be a perfect success, and the most profitable investment in these islands.

WELL STATED.—Among the speakers at the opening of the Atlanta Exposition in September, was Booker T. Washington, a pure negro, who was educated at Hampton School. Among other things he said: "No race can prosper until it learns that there is as much dignity in tilling a field as in writing a poem. It is at the bottom of life we must begin, and not at the top. Nor should we permit our grievances to overshadow our opportunities"

Every business man, every workingman and every farmer is perfectly satisfied with the greenbacks and infinitely prefer them to gold or silver coin. Why? Simply because every citizen of America knows that behind every one of those greenbacks lies the whole wealth of the United States, \$75,000,000,000, over \$200 of good property for every dollar of greenbacks issued, so that no sane man of ordinary intelligence ever dreams of doubting that the greenbacks are "good" money in the best sense of the term.—*Journal of Knights of Labor*.

TO KILL ANIMALS WITH A SPIKE.—The Connecticut Humane Society has ordered an animal-killing device from Paris. It consists of a mask which fits over the animal's head, blind-folding it. In the centre is a spike set in such a way that it can be driven into the brain by a single blow, causing instant death. The society will kill all diseased or injured animals in this manner instead of shooting them, and will endeavor to have butchers do the same in slaughtering cattle.—*New York Sun*.

In 1876 there were probably 1,250,000 tons of cotton seed crushed in the United States, says P. L. Simmons in the *American Journal of Pharmacy*. From this seed there were obtained 1,000,000 barrels of oil. It is estimated that 300,000 barrels were used in Chicago for making oil lard; and that St. Louis, Kansas City and Omaha took 200,000 for the same purpose. About 250,000 barrels went to Holland for making margarine, and large quantities to Southern Europe for mixing with olive oil.

SMUGGLING OPIUM IN DEMERARA, A BRITISH COLONY.—On Tuesday last, the steamer *Nonpariel* was siezed by the Custom House authorities on account of their finding 48 pounds of opium hidden in a room adjoining the Captain's cabin. It is reported that the authorities have been suspicious of opium smuggling for some time past. How the opium got into the place where it was found can only be guessed. On payment of a fine of \$800 the steamer was released yesterday.—*Demerara Argosy*, Sept. 28.

This table is published in the *Deutsche Kirchenzeitung* (Berlin): The population of the earth is estimated at 1,500,000,000, distributed as follows: Europe, 381,200,000; Africa, 127,000,000; Asia, 354,000,000; Australia, 4,730,000; America, 133,670,000; total, 1,500,000,000. The leading religions are represented by the following figures: Protestant Christians, 200,000,000; Roman Catholic Christians, 195,000,000; Greek Catholic Christians, 105,000,000; total Christians, 500,000,000. Jews, 8,000,000; Mohammedans, 180,000,000; Heathens, 812,000,000; total non-Christians, 1,000,000,000.

Dr. Parville relates the following facts: If a can of milk is placed near an open vessel containing turpentine, the smell of turpentine is soon communicated to the milk. The same result occurs as regards tobacco, paraffine, asafoetida, camphor and many other strong-smelling substances. Milk should also be kept at a distance from every volatile substance, and milk which has stood in sick chambers should never be drunk. The power of milk to disguise the taste of drugs—as potassium iodide, opium, salicylate, etc.—is well known.—*Gaillard's Medical Journal*.

A method of preserving unripened tomatoes which remain on the plants when the first frost comes has been sent to *Garden and Forest* by Professor Massey, of the North Carolina Experiment Station, who says that when frost is imminent he gathers the green tomatoes, wraps them separately in paper (old newspapers will answer), and packs them in boxes, which are stored in a place just warm enough to be secure from frost, the object being to keep them and not to ripen them. Then, as they are wanted, a few are brought out at a time and placed in a warm position, where they will ripen in a few days. In this way a table can be supplied with sliced tomatoes up to midwinter, or for a sea voyage.

INDIGO PLANT.—An item in the *Louisiana Planter* refers to an experiment made in the island of Martinique with indigo as a suitable plant to rotate with cane. It is said to have increased the product of the cane field considerably, so that the cost of producing a ton of cane on indigo land was reduced very much. Indigo may prove to be a good plant to rotate with cane, but perhaps no better than some now used, such as cowpeas, clover, etc. Thirty years ago, the island of Oahu was overrun with indigo, very much as it is being overrun now with the mimosa plant known as *kahu*. Cattle, when deprived of their rich grass by this weed, soon learned to relish the indigo, when the leaves were fresh and young, and after a few years the indigo was exterminated by them. It is now so scarce, that the flower is rarely seen.

The presence of the four masted City of Adelaide in our

harbor has raised the question among sailors as to the proper term which vessels of her rig should be called. Her foremast is square-rigged, and her other three masts are schooner-rigged. Her proper class is *shipentine*. A full-rigged brig, if she changes the rig of her mainmast to fore and aft sails, becomes a *brigantine*. The same with a bark, if she changes her mainmast rig to fore and aft sails, becomes a *barkentine*. So when a four or five masted ship changes her rig to fore and aft sails, excepting the foremast, she becomes a *shipentine*. If the rig of all her masts is changed to fore and aft sails, she is properly called a four or five masted schooner. The "shipentine City of Adelaide" is the proper term to give the vessel of that name now in port.

ELECTRICITY IN THE AIR.—The supply of electricity in the air is continually renewed. The waterfalls in the valleys, the plashing of the waves on the shores of the lakes and rivers, and the splash of drops of rain on the ground send masses of negative electricity in the air; even the watering of our streets and of our plants in the orchards has the same effect on a limited scale. On the other side, the waves of the sea, as they break against the rocks and fall back in milliards of droplets upon the beach, supply the air with masses of positive electricity, the amount of which rapidly increases after each storm. And when we stand on a sea-beach we not only inhale pure ozonified or iodized air, but we are, so to say, surrounded by an electrified atmosphere, which, as already remarked by Humboldt and often confirmed since, must have a stimulating effect upon our nervous activity as well as upon the circulation of sap in plants.—*Public Opinion*.

The coffee industry on Hawaii is being pushed forward by as energetic and intelligent a class of men as ever engaged in pioneer work. They, however, labor under drawbacks of various kinds, which only time and perseverance can overcome. This industry requires five years to bring it into a paying condition; and to succeed, the pioneers need not only perseverance, but ample means to carry along their load, until the crops begin to come in freely, when brighter prospects will follow. No better coffee is anywhere raised

than Hawaiian, and this fact alone should give firm assurance as to the ultimate result. All who have used it, both here and in other countries—some many years—are unanimous in the opinion that for delicious flavor and for permanent health-growing qualities, there is no equal to the pure Hawaiian coffee. Still, the amount for export this year will be small, as none of the new plantations are yet five years old; but in 1896, better returns may be expected.

THE SILVER-SWORD.—The expedition of Libby and Sharpe to the Sandwich Islands, has proved very rich in objects of natural history. Some perfect specimens of the silver-sword plant (*Argyroxiphium Sandwicense*) were taken by them to the United States. The first knowledge of this plant seems to have been derived from the collections of the Wilkes exploring expedition. The plant is perennial, enduring for many years, the main root forming a woody stem, from one to two inches thick, and from two to three feet high. The leaves are very narrow, from a quarter to a half-inch wide at the base, narrowing to a dagger-like form. These are so thickly covered with shining silvery wool, that not a solitary bit of green can be discovered even by scraping. But the greatest wonder is in the number of these dagger-formed leaves. They run from one hundred to five hundred on each plant, and are jammed in so thickly together, that only about half the upper portion is free from contact with each other.

STRENGTH OF WOOD.—As a result of nearly 40,000 tests of timber made at the laboratory of the Washington University at St. Louis, under the direction of the Forestry Division of the Department of Agriculture, says *Railway Engineering and Mechanics*, the following facts have been determined: Seasoned timber is about twice as strong as green timber, but well-seasoned timber loses its strength with the absorption of moisture; timbers of large sections have equal strength per square inch with small ones when they are equally free from blemish; knots are as great a source of weakness in a column as in a beam; long-leafed pine is stronger than the average oak, and bleeding timber does not impair its qualities. It is stated that a large amount of

chestnut felled in Alabama for the tanbark was allowed to rot because its value for railroad ties was not known. The Division of Forestry called attention to the superiority of this timber for ties, and the wood is now so utilized, with a saving to that region alone of nearly \$50,000 per year.

The war has been over thirty years. There never has been any trouble since between the men who fought on the one side or the other. The trouble has been between the men who fought on neither side, who could get on the one side or the other, as occasion or interest demanded. The bitterness and resentments of the war belong to the past, and its glories are the common heritage of us all. What was won in that great conflict belongs just as securely to those who lost as to those who triumphed. The future is in our common keeping, the sacred trust of all the people. Let us make it worthy of the glorious men who died for it on this and other fields of war. * * * In this great battle some fought to save the Union; others to divide it. Those who fought to save triumphed, and so the Union survived. Slavery was abolished, peace restored, the Union strengthened, and now, hand in hand, all stand beneath the folds of one flag, acknowledging no other, marching forward together in the enjoyment of one common country and the fulfillment of one glorious destiny.—*Gov. M'Kinley.*

THE AMERICAN SUGAR BOUNTY.—In noticing the decision of Commissioner Bowler, not to pay to the American sugar manufacturers the amount justly due to them, which was voted by Congress, the *Manchester Sugar Cane* applies the following keen but justly-deserved comments: "Thus the unfortunate planters, who certainly had a clear moral right to the whole of the bounty, but had to be contented with only the half, cannot even obtain this without resorting to the slow process of contesting the matter in the Court of Claims. Truly these things are *cosas de Espina*, and behind this arbitrary action of the individual may lurk the unseen influence of the entire Government, but we may be allowed to remark that under our supposed "effete" monarchical system no official, or body of officials whatever, would be allowed thus

to frustrate the carrying out of the decision of the national assembly, and we venture to assert that after all there is more real freedom and justice in such matters in this country than in the Great Republic."

The severest censure that Congress can expect for such a bold defiance of its authority, would be quietly to drop the salary of the Commissioner from its annual appropriation for salaries.

TAXES IN FRANCE.—People who take exception to the internal revenue taxes imposed in the United States may take some satisfaction in learning how much worse off are the French in this respect, as disclosed in a report to the State Department by United States Consul Wiley at Bordeaux. He shows that every form of legal paper, cheques, notes and documents, bills of lading, even lithographed posters, must have a revenue stamp affixed. From this source the treasury draws its principal revenue, amounting last year to \$140,000,000. The spirit and wine tax amounted to \$120,000,000. The custom house receipts were \$100,000,000; the tobacco, matches, playing cards and other government monopolies, yielded \$130,000,000. Sugar paid an internal revenue tax of .052 per pound—\$29,000,000 in all. The land tax brought in \$39,000,000, and personal property \$28,000,000. If a clerk occupies a hall room, he pays a tax of \$2 per annum, while his landlady not only has to pay for her poodle, but for every door and window in the house. As the treasury receives \$12,000,000 per annum for windows alone, the architect who can design a house with the least possible amount of ventilation does the best business. If you own a horse, carriage, billiard table or bicycle, you are taxed—the government collects \$6,400,000 annually for permitting such luxuries to exist, and a bill was recently introduced in the Chambers to tax the wearing of corsets. Business licenses bring in \$24,000,000 per annum.—*Washington Star*.

CUBA.—As we stated last week there is no longer any doubt that the rebels mean to prevent the grinding of the cane wherever it is in their power to do so. There are several reasons for this course. They wish to diminish the Spanish

revenues, while at the same time preserving the sugar cane of the country in case their cause shall prove successful. The cane fields of Cuba do not require to be cut in January, 1896, but can be allowed to stand nearly eighteen months longer without losing a very large part of their saccharine strength. Any planter who leaves his cane uncut this season as already ordered by the rebel commanders, may still benefit from it another season, while the planter who starts in to cut his cane is very sure to have his sugar mills and his cane fields burned, thereby destroying not only this year's cane, but the cane stocks which will take years to replace. It is this condition of events which has already decided many estate owners to abandon all attempts to make sugar this season. Spanish protection, which is offered to all planters, so that claims for damages may not be made on Spain, is generally considered by planters of little value against the carrying out of rebel threats. Many estates accept the position, but will still fear to begin grinding. Under these circumstances some very low estimates are being made, but we will still adhere to our original estimate of 600,000 tons, which looks high now, although when we made it we were considered highly pessimistic.—*Willett and Gray Statistical*.

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WITH OUR READERS.

The article on cane cutting, from the *Louisiana Planter*, on page 513 will be read with interest by every one engaged in sugar planting. Like everything from the pen of Mr. Dymond, it is instructive, and shows how this difficult question is being studied by one of the foremost planters in the world. While no solution of it, or even any improvement in the old method has been made, it is not improbable that some way will be devised to reduce what has always been one of the most expensive items in the field work of a sugar plantation.

—Those who are studying the future of Hawaii, especially in the line of upland forestry, may derive some new ideas regarding the cork oak trees, that furnishes the bark from which corks are made, by perusing the article on this subject

on page 520. It is stated that our seven billions of corks are required to supply the wants of commerce, and as this demand is constantly increasing, and the sources of supply are decreasing, the bark will always be in demand. No substitute has ever been found for oak corks.

—Referring to an item in our October issue, Mr. D. S. Kay of Kohala sends the following note: "In your October issue you endeavor to correct what you term a misstatement, which appears in the Manchester Sugar Cane of August 5th. As I am cognizant of the source from whence the Sugar Cane derived its information, I beg to say the writer, in the main, is perfectly correct, if the statement is applied to the Kohala and Hamakua districts of Hawaii. In Kohala, the Rose Bamboo variety of cane, for the present at least, has almost entirely superseded the Lahaina, nearly nine-tenths of the sugar produced in this district is from the Rose Bamboo, for the simple reason, that it has been found an all round better cane for both upper and lower lands, on account of its greater hardihood and ability to withstand droughts. I think all practical planters will agree that a cane like the Lahaina, which, as you say, "flourishes to perfection in a warm but moist low land plain," will not flourish quite so well, where the above conditions are almost entirely reversed *to successive seasons of drought*. In such cases, there is most marked deterioration, and the old saying of "like producing like" is most unfortunately the result. A remedy most undoubtedly lies in a change of seed cane and climatic conditions."

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CANAIGRE OR TANNERS' DOCK.

In the PLANTERS' MONTHLY for February, 1895, was published in full a paper prepared and sent to us by Professor Hilgard of the University of California, giving a very full account of this new dock root which is being cultivated from California to Texas, as a cheaper and better article for tanning certain kinds of leather, than the oak and other barks so much used for this purpose. Professor Hilgard's article gives not only a minute description of the root, which resembles a dahlia root, or a sweet potato, weighing six to fourteen

ounces each, but also directions, for its propagation, cultivation, harvesting, marketing and in short all the information desired by persons wishing to engage in the canaigre business. It also shows a comparison between this plant and other plants and barks, as to their relative values, and no person engaging in the business of growing canaigre, should fail to study it.

In a recent issue of the *Phoenix Herald* of Arizona, Professor Gulley, of the territorial University, states the efforts now being made by a local company, to engage in harvesting the wild canaigre which grows there so abundantly. Quite an army of men has been employed the present year collecting the roots both for shipment and for planting, the company having secured a tract of 2000 acres to be planted exclusively to canaigre. They use a slicing machine, through which the roots are passed, with a speed of about five tons an hour. When dried, and run between cylinders, they are pressed in bales like cotton, and shipped to Eastern tanneries, which have engaged to take all that may be sent to them. It is stated that those engaged in this pioneer business are men with ample capital, who are determined to make the business a success.

An item in the *Riverside Press* states that forty tons of wild canaigre were recently on exhibition in that city. It was gathered in that country by the Mexicans, who receive \$3 per ton for the green roots and \$12 per ton for the dried article.

In the *Daily Advertiser* of a recent date, are published the letters of Commissioner Marsden of the Agricultural Bureau, and Consul Wood of San Diego, calling attention to the desirability of engaging in the cultivation of canaigre for export. There can be no doubt that the cultivation of this root will open a paying business, if commenced properly, in localities adapted to its growth, and with the necessary machinery to slice and bale it for shipment; or what is still better, to prepare the extract and put it up properly for export, as in this shape, it will keep indefinitely and preserve its good quality for other purposes than tanning leather. What it will realize when disposed of in the Eastern American or English markets, can only be ascertained on trial.

Great care, however, should be taken with the first shipment to have it sent off in the best possible condition, as any mistake then made might discredit future ventures from this quarter.

A cotemporary periodical says, that canaigre is expected to enter largely into arts and industries other than leather-making. In the manufacture of dye-stuffs and mordants the extract is said to be very valuable, and high hopes are entertained for canaigre becoming an important article in American agriculture.

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TO GUARD AGAINST EPIDEMICS.

The question of sewerage for the city of Honolulu, although chiefly of local interest, becomes each year of more importance to the health of the place. Owing to its location on a level plain, only a few feet above the sea, whatever plan may be adopted to dispose of the accumulation of filth and waste of the city, it must necessarily be an expensive one for its inhabitants, by whom the cost should be done. If the sewer system is adopted, all these conduits must discharge into the sea beyond the reef, and not into the river or harbor, which are so small, and with so little ebb and flow of the tide, that they would soon become little else than pest-breeding pools, as threatening to the health of the city as is its present condition.

The incineration plan of burning the waste and filth of the place, which has been adopted in several large ports and inland cities in America, has its advantages and its disadvantages. It is costly, but effectually disposes of it, the ashes or refuse being utilized as a fertilizer. But in certain conditions of the weather, the smoke and effluvia arising from the burning operation, when continued day and night, is said to be very obnoxious and unhealthy. Yet it is conceded to be the most effectual method yet tried, and may eventually have to be adopted here.

Another plan has been suggested, which at best would be only a partial and temporary expedient, the cost of which would fall on citizens and not the on national treasury. This is to enforce by law the digging of deep vaults or cesspools in

connection with every dwelling and store, down to and into the layer of black sand. There is underlying the greater part of Honolulu, a stratum of black volcanic sand, through which water will percolate till it reaches a rocky or clay substratum. This black sand deposit is generally found from five to twenty feet below the surface, and forms a natural drain for cesspools and sinks, which may serve the purpose intended for several, perhaps twenty years, according to the depth of the pit and the manner in which it has been lined. If occasionally flushed with a stream of rain or artesian water, it may be considered as nearly perfect as any expedient that can be devised for the same cost. Flushing serves to cleanse the pit, as the water flows off through the sand below. This plan may prove to be the best temporary makeshift, if its requirements are fully carried out.

Where dwellings or stores near the seashore rest on coral foundation, this plan will not do. But in such cases, a pit dug through the soft coral to a depth of ten to fifteen feet, will generally reach the tide water, which flushes the vault with every ebb and flow of the tide. There are a number of such vaults now in the lower part of the city.

The following extract from the letter of a correspondent, published in one of the New York papers, shows the situation of the sewage and drinking water supply in one of the largest cities of New York state, and its capital city :

“Here in Albany we have made little advance toward a solution of the water and Sewage question. After years of seeking other source of water supply, the city has fallen back on the Hudson River as the chief source, and has recently put in new pumps for the purpose. All our sewers empty into this river. The intake of water is, of course, above or beyond these, but six or eight miles above us Troy, Lansingburg, West Troy, Cohoes and Waterford empty their sewage into the same stream. Running water is said by some to purify itself in that distance. Perhaps it does. At all events, many persons drink the unfiltered water without apparent injury, and even some physicians laugh at the idea of either filtering or boiling it. Nevertheless, typhoid and other fevers are more prevalent than they ought to be in so healthfully located a city, and half-a-dozen venders of neighborhood spring water do a thriving business. After one has voyaged between Albany and the towns above her, looked into the

mouths of discharging sewers and counted up the young men and boys engaged in bathing in the river, he feels like giving up water-drinking altogether. I do not hear of any plans for purification of the Albany water supply or of the sewage.

"When we come to villages the same difficulties exist, only in lesser degree. Geneva, N. Y., carries her sewage into Seneca Lake, but well out toward the center, when an under-current is supposed to take care of it. But the idea is not pleasant, of thus befouling a beautiful sheet of water, and sooner or later some plan of filtration must be adopted, whereby impurities can be retained and the water discharged absolutely free thereof."

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WAGES IN JAPAN.

Attention has recently been called in the local press to the low wages that prevail in Japan. Like wages paid in China and other Asiatic countries, they are extremely low. A table of the current rate in Japan has lately been published in Washington, as furnished by Consul General McIvor, which we insert :

<i>Description</i>	<i>Wages per day of 10 hours.</i>	<i>Description.</i>	<i>Wages per day of 10 hours.</i>
Carpenters	\$0 26	Sake brewers.....	22
Plasterers.....	26	Silk spinners (female).....	17
Stonecutters.....	31	Tea workers (picking and pre- paring).....	29
Sawyers.....	29	Tea firing:	
Roofers.....	26	Male.....	{ 10
Tilers.....	31	Female.....	{ 14
Matting makers.....	24	Female.....	{ 07
Screen makers.....	26	Female.....	{ 12
Joiners.....	29	Common laborers.....	19
Paper hangers.....	24	Confectioners.....	17
Tailors:		Sauce makers.....	24
For Japanese clothes.....	24		
For foreign clothes.....	48		<i>Per Month.</i>
Dyers.....	24	Farm laborers:	
Cotton beaters.....	17	Male.....	\$1 44
Blacksmiths.....	33	Female.....	1 20
Porcelain makers.....	24	Silkworm breeders:	
Porcelain artists.....	{ 38	Male.....	1 92
	{ 72	Female.....	96
Oil pressmen.....	24	Weavers (female).....	96
Tobacco cutters.....	19	Servants in foreign houses:	
Ship carpenters.....	29	Male.....	\$2.88 7 20
Lacquer workers.....	24	Female.....	\$2.40 4 80
Compositors.....	29		

These are the wages in American money, the Japanese yen being quoted at 68 cents as compared with the American dollar.

A BRIEF SKETCH

OF THE

Early History and Growth of the Sugar Industry in Hawaii,

AND

ITS PRE-EMINENT ADVANTAGES AS A FIELD FOR INVESTMENT OF CAPITAL.

When the Sandwich Islands were discovered in 1777 by the renowned navigator, Captain James Cook, of the Royal navy, the group was named by him in honor of his patron, the Earl of Sandwich, then first Lord of the Admiralty. The gallant Captain and his officers at once became deeply impressed with the rare beauty of their island realm—the loftiness of its mountains, the picturesqueness of its vallies, and the bright, emerald robe with which Nature had clothed them.

THE SUGAR CANE.—Among the great variety of luxuriant tropical plants which attracted the attention of Cook and Vancouver, none excited greater admiration than the native sugar cane with its astonishing growth and stalks, twenty feet long on Kauai, and its remarkable sweetness. It was found growing in every valley visited. The cane was, no doubt, originally introduced by the first settlers, who, as many believe, came from the East Indies, China or Japan, many centuries before Cook's visit. The extraordinary saccharine qualities possessed by the cane found here may have been developed in part by the wonderful richness of the soil and the mild climate, which have combined to bring it to a perfection that it has nowhere else reached, yielding in some instances, of late years, from six to ten tons of pure sucrose per acre.

FOOD FOR THE NATIVES.—To the aboriginal inhabitants of Hawaii, sugar cane has been for centuries an indispensable article of diet. From it they derived both food and drink, and whether travelling on foot, or voyaging in canoes, it served to appease both hunger and thirst. It was therefore universally cultivated, and cared for by them in their rude way.

FIRST SUGAR MADE IN HAWAII.—Soon after the discovery of the group, early foreign adventurers, but chiefly Chinese, attempted by various rude methods, to make both molasses and sugar from cane, these efforts dating from the early years of the present century. The first intelligent effort to establish a sugar factory, of which there is any record, was made in 1835, when the American firm of Ladd & Co., secured a tract of land at Koloa, on the Island of Kauai, and two years later erected the first iron sugar mill ever set up in this group, which was propelled first by mules, then by water, and still later by steam.

FIRST SUGAR EXPORTED.—In 1837, a small export of sugar was made from Honolulu, which is said to have been the product of the Koloa mill. This pioneer plantation, having changed ownership several times, is still in prosperous condition, and is owned by the Koloa Sugar Co., a chartered corporation, composed chiefly of Germans. No better illustration can be desired to prove the security of the sugar industry in Hawaii, and the adaptability of the soil for cane culture, than the fact that for sixty years the Koloa fields have been tilled and cropped, with profitable returns to its owners. This has been accomplished by skillful rotation and intelligent use of fertilizers. That it is to-day more productive than ever before, and more valuable as a permanent investment, demonstrates beyond a doubt the good qualities of Hawaiian soil for sugar cane culture, and the security of this industry as a permanent investment for domestic or foreign capital. These remarks will apply with equal force to other sugar estates on these islands.

EARLY STATISTICS.—The growth of this industry in Hawaii which dates from the erection of the pioneer mill named above, was very slow in its earlier years, as indicated by the following data:

The sugar exports from 1837 to 1841 averaged only 142,166 pounds annually, this being probably the product of the Koloa mill.

For the following ten years, 1842-51, the exports averaged 478,024 pounds per annum.

The next twelve years, 1852-63, show the yearly exports to have increased to 1,566,539 pounds.

From 1864 to 1875 an average of 18,844,535 pounds of sugar is shown.

Up to the last date named, the sugar mills were mostly of a primitive class, with open kettles, double and triple effects having but recently come into use. There has never been any general set-back or failures in the sugar industry of Hawaii from climatic causes, but its growth has been steady, though slow, from lack of capital.

ERA OF RECIPROCITY.—This brings its history down to the period of reciprocity with the United States, the treaty granting it having taken effect in the autumn of 1876. The exports for that year were about 36,000,000 pounds. Under the impetus derived from this treaty they rapidly increased, reaching, in 1882, 114,000,000—all exported to the United States. Three hundred million pounds may be taken as the average capacity of the present sugar industry of Hawaii. Fully three-fourths of the exports comprise high grades equal to Cuban centrifugals of 90 deg. to 98 deg. polariscope test.

AN HAWAIIAN INVENTION.—A fact worthy of mention may be stated here, showing the ingenuity and skill of mechanics in Hawaii, in connection with the development of the sugar industry. The well-known centrifugal machine, now used in every first-class sugar factory throughout the world, had its origin in Honolulu, and was first used in Hawaiian mills for drying sugar. Mr. David M. Weston, its inventor, was a machinist who had a shop and foundry in Honolulu, and it was here that the idea of drying sugar by centrifugal motion, was conceived by him in the year 1850, while observing that wet cloths laid on a burr mill stone, while in rapid motion, became dry very quickly. His first centrifugal dryer, which was a very rude one compared with those now in use, was set up in the East Maui sugar mill, where it was at first driven by hand power. It worked satisfactorily, drying the sugar in a few minutes, while formerly it required weeks to dry in the tanks. Several improvements were made by him, resulting in much better work. The machine as now used originated in Hawaii.

CYCLONES UNKNOWN IN HAWAII.—Another item of special importance to investors in Hawaii is the fact that this group

is singularly exempt from destructive hurricanes, cyclones and droughts, which cause great loss to crops in other countries, and render investments there extra hazardous, when of frequent occurrence. In examining the record of sugar crops in Hawaii, as shown by the export tables, no instance can be found of any material decrease in the annual out-put, caused by losses from storms or droughts. It is not an unusual occurrence for the crops of Cuba, Mauritius, and Islands of the East and West Indies to be largely reduced by these disasters; in some instances one-half of the crops having been destroyed, entailing very heavy losses on those pecuniarily interested in them. As far back as records go, there is no record of any great loss to the cane from storms or other disasters, simply because destructive cyclones and hurricanes never visit this group, although occurring frequently far to the south and west of us. Capitalists, who desire to make investments in Hawaii, should not overlook these remarkable climatic conditions, so favorable to the security of life and all kinds of property. The Sugar Industry in Hawaii has always been remarkably exempt from losses of this nature, and this fact renders investments here comparatively safe.

ANNUAL SUGAR EXPORT.—The present annual output of sugar may be set down at 300,000,000 pounds, and the total outward and inward trade of the islands at \$15,000,000. The variations from these figures in the export of sugar, are in part caused by an increase or decrease in the value of sugar, in the area of cane planted, and from the fact that a rise or fall in its price stimulates or retards the early harvesting which generally begins in November, and ends in July or August. Thus a portion of the crop of one year may be included in the statistics of the previous year, as of those of 1893 and 1894, that for 1893 being abnormally large and that for 1894 smaller. The crops in Hawaii, are as a rule, more reliable than in any other tropical or sugar-growing country.

PROFITS IN SUGAR.—The figures given in the table on next page most certainly present a flattering exhibit in favor of these islands and their leading industry. Taking the results of the years 1891-2-3, which represent the period when the

McKinley Tariff of the United States, deprived the planters in Hawaii of the benefit of a duty on sugar, the statistics show an annual profit of over \$4,000,000 to the credit of Hawaiian exports, as compared with the imports. This balance of trade may be taken as representing the profits or dividends disbursed here and in America among those interested financially in Hawaiian plantations. Probably over one-fourth of the sugar stock is held abroad.

COMMERCIAL STATISTICS.—Having presented a brief outline of the early history of the sugar industry in Hawaii to the date of the reciprocity treaty with the United States, and also shown the comparative security of investments made here, a statement of the expansion of the industry since 1876 will indicate what has been accomplished during the eighteen years that this convention has been in force. The following statistics have been compiled from the official reports of the Hawaiian Custom House, and show the quantity of sugar exported each year, as also the value of the imports and exports, and the combined value for each year from 1877 to 1894 inclusive :

<i>Years.</i>	<i>Pounds Sugar.</i>	<i>Imports.</i>	<i>Exports.</i>	<i>Total Foreign Trade.</i>
1877	25,575,965	\$2,554,356	\$ 3,676,202	\$ 6,230,558
1878	38,431,458	3,916,370	3,548,472	7,464,842
1879	59,020,972	3,742,978	3,751,718	7,524,696
1880	63,583,871	3,673,268	4,968,445	8,641,713
1881	93,789,483	4,547,979	6,856,436	11,403,445
1882	114,177,938	4,974,910	8,299,017	13,273,927
1883	114,107,156	5,624,240	8,133,344	13,757,584
1884	142,653,923	4,037,514	8,195,182	12,832,696
1885	171,350,314	3,830,544	9,069,318	12,899,862
1886	216,223,615	4,877,738	10,457,285	15,335,022
1887	212,761,647	4,943,840	9,529,447	14,473,288
1888	235,888,346	4,540,887	11,707,598	16,248,486
1889	242,165,835	5,438,790	13,874,341	19,313,132
1890	259,798,462	6,962,201	13,142,829	20,105,030
1891	274,983,580	7,439,482	10,258,788	17,698,270
1892	263,656,715	4,684,207	8,060,087	12,744,294
1893	330,822,879	5,346,808	10,818,158	16,164,966
1894	306,684,993	5,713,181	9,140,794	14,853,978

REDUCING EXPENSES.—There are now in these Islands about sixty sugar estates, valued at \$40,000,000, with an average annual output of 300,000,000 pounds of sugar. The tendency is to curtail expenses by combining small estates with the larger ones where conditions favor it. The latter possessing superior field and factory machinery, can manufacture at much less cost and extract a larger quantity than the two

separate mills can. Where such combines can be made, the change results greatly to the advantage of both parties, by a large reduction of field and factory labor.

IMPROVED MANUFACTURE.—A considerable portion of the increase in the output of sugar cane here, as well as the beet sugar in Europe, must be credited to improved methods of cultivation, with choice seeds and the use of good fertilizers, and also to the great improvements introduced in the sugar house with heavy machinery and more intelligent oversight in the various stages of sugar manufacture. In all these branches of the service, Hawaiian sugar planters stand the front rank, and are always ready to adopt the latest improvements.

PROPERTY AND TAXES.—Hawaiian sugar estates are owned almost exclusively by foreigners residing here or abroad; three-fourths of the capital employed being American, the remainder being distributed among Europeans. Taxes are levied annually by the Government on all property, real and personal, on the basis of one per cent. per annum, the valuation being generally equitable and fixed by a board of appraisers. The total amount derived by the Government from personal and real property throughout the islands for the year ending March 31, 1894 was \$539,412.11. The entire revenue of the Government for the same period was \$1,995,651.37. The public debt at the close of the year 1894 was \$3,586,161, about half of it held in Hawaii, and the balance in America or England. No taxes are levied on real or personal property except the one per cent. imposed by the general Government. There are no county, city or district taxes, the national tax of one per cent. referred to above covers all assessments on property. Traders of all kinds pay licenses, in addition to taxes.

HONOLULU.—Of the above total population, about one-third reside on the island of Oahu. According to a recent enumeration made by the Government, the City of Honolulu contains 28,061 inhabitants of whom 8,051 are Americans and Europeans. The population of the group is believed to be increasing at the rate of 1,000 per annum, and from present indications will continue to do so. Education being compulsory and free in Hawaii, the rising generation of natives and

Asiatics promise to be a more intelligent class than their parents are.

POPULATION.—The latest census of the population of these islands was taken in 1890, when it showed a total of 89,990. Since that year there has been a marked increase, and the most recent estimates give the following, which is thought to be reliable :

Native Hawaiians	34,000
Half Whites	7,500
Chinese	15,000
Japanese	22,000
Americans, Europeans, and their descendants	24,000
Total population in 1895	102,500

THE SUGAR BELT.—The extent of land available for sugar cultivation in these islands is limited to a belt on each of the four larger islands, extending from the sea to an elevation of ten or twelve hundred feet above it. Only part of this, however, is suitable for cultivation, the larger part being rocky, rugged and destitute of streams, or monthly rains. The most of the arable land is already taken up with sugar estates. Above twelve hundred feet elevation, the climate becomes too cold for profitable cane culture, as it there requires two or more years to mature. The Lahaina cane, which does so well on the low lands, being almost the only variety cultivated there, will not thrive on the high lands, where only the red and more hardy varieties will grow.

EWA PLANTATION.—It will thus be understood why new plantations, to insure success, must be located in the warm belt, to which an abundant supply of water can be brought for irrigation. Such was the case with the Ewa lands on Oahu, and Makaweli on Kauai. Both were located on warm and dry plains, bordering on the seashore, on the lee side of Oahu and Kauai. Both possess deep and rich volcanic soils, admirably adapted to cane cultivation, provided water in ample supply for irrigation could be obtained. This was secured for the Ewa Plantation by sinking twenty 10-inch artesian wells, and pumping the fresh water thus obtained to a maximum height of one hundred and forty feet, which became necessary, in order to spread it over the lands selected for cane planting.

MAKAWELI.—In the case of the Makaweli Plantation, the

water supply comes from mountain streams, but in order to distribute it over the elevated lands, it became necessary to tap the streams high up the mountain, and to lead the water in deep trenches and across several ravines in iron pipes of forty inches in diameter. This task called for skillful engineering and an expense fully as large as that for raising the artesian water for the Ewa enterprise. The cost in each case involved an outlay of \$150,000 for water alone, but it accomplished the object sought—to provide an ample supply for all the necessities of the plantation. In both cases it has proved to be money well spent, as each project, so different in detail, combines all the conditions necessary to insure large crops annually and with uniform regularity.

A GRAND SUCCESS.—These enterprises were thought by some to be hazardous on account of the large expenditure required to obtain the water. Time has proved that with ample capital, good and permanent results may be obtained in raising sugar cane, even in a rainless district. From these two magnificent estates, cane crops are now had, varying from 20,000 to 25,000 tons of sugar annually, worth in the American market, where it enters duty free, \$1,000,000 to \$1,200,000; and this is the result of an expenditure of \$3,500,000, which could only have been possible by the aid of foreign capital, placed under judicious management, and spent solely for the object designated in the prospectus. These two plantations will undoubtedly continue to be a lasting and profitable source of income to their shareholders for a century to come, or so long as sugar shall be in demand as a staple article of food, and one of the leading products of commerce.

THE NEW SUGAR ENTERPRISE.—As before stated, the available land on these islands, suitable for cane culture to any large extent, and based on natural advantages, is practically exhausted. What remains to be done now is to appropriate lands equally good as regards soil, location and temperature, but deficient in the natural supply of rain or river water needed for the growth of cane, and with skill and capital overcome this deficiency by artificial means from supplies prepared by an all-wise Providence, but obtained only at great cost. It is proposed to raise all the water needed on the Oahu Plantation by artesian wells to a height varying from

100 to 650 feet above the sea level. That this project is feasible has been demonstrated by the successful working of the artesian system on the Ewa Plantation. It is the same work on a much larger scale. It will require double the amount of water, raised to a much higher elevation, but when once brought into successful operation, its efficiency must increase from year to year. As has already been shown, there is no safer investment than a sugar estate in Hawaii, which combines a perfect climate and soil, with an abundance of land and water, and all the other requisites needed to produce the greatest amount of sugar at the smallest cost, and with the largest profit to its shareholders.

OAHU PLANTATION.—The proposal to establish a new and larger plantation than any now here, on the land lying adjacent to and above that of Ewa, to be called the "Oahu Sugar Plantation," is based on the same principle as the one just named, also that of Makaweli;—to obtain an ample water supply by artificial means. The expense attending this will be large, but once secured, the supply will unquestionably be permanent, if past experience is reliable. Manager Lowrie, of the Ewa Plantation, says: "Our experience during the past four years shows conclusively that there is no diminution in the water supply, as the gages on the wells indicate the same figures, whether it be July or January." The quantity of water now drawn out from the twenty artesian wells at Ewa is estimated to be not less than six to eight billion gallons annually, and there has been no scarcity of water for all uses of the plantation in any year nor on any occasion. On the contrary, an abundant supply has always been found ready for use.

As the success of this enterprise lies in the ability to secure a permanent supply of artesian water for irrigation on the scale proposed, the following extracts from the report of the expert surveyors, Messrs. Schuyler and Allardt, who made a full and exhaustive investigation of the subject, will be read with interest:

THE ARTESIAN WELL SUPPLY.—The discovery of the possibility of obtaining a supply of flowing water by deep artesian boring around the margin of this Island has been of incalculable value to all property interests, and has compensated

in a measure for the loss occasioned by the perpetual robbery of the waters that fall so copiously on the mountains by the porous and thirsty earth, and for the waters lost during torrential storms by rapid drainage into the sea. On no other island of the group has Nature provided so abundantly for such compensation, and even here the geological formation is so different from that of any other region the world over where artesian water is obtained by boring, that no scientific man will risk his reputation in predicting the possibility of securing flowing wells by boring in the volcanic and coral formations of this country before success had demonstrated the fact.

“Mr. James Campbell, the present owner of Honouliuli and Kahuku, is credited with the distinction of having been bold enough to try the experiment which resulted in the first flowing well of the kingdom. This well was bored in 1879 on the lowest slopes of Honouliuli ranch, and a good flow attained at a depth of 273 feet. It has been followed by so many successful attempts in the same direction that the flowing wells on the island now number over one hundred, some of which equal, if they do not exceed, the flow of the largest and most famous wells in California. One of a group of four wells, bored by Judge McCully on King and Beretania streets, Honolulu, was carefully measured a few days since by Messrs. Allardt and Kluegel, and the flow was ascertained to be 3.98 cubic feet per second, or 2,580,000 gallons in twenty-four hours. The combined flow of the four wells was ascertained to be 10.68 cubic feet per second, which is equivalent to about half of the present water supply of San Francisco, a city of more than 300,000 inhabitants. Two of the smallest of them flowing 4.1 cubic feet per second, are now made to irrigate one hundred acres of rice.”

Mr. C. H. Kluegel, Chief Engineer of the Oahu Railway and Land Co., says of one of the springs on the land designed for the Oahu Plantation, “The amount of the water flowing into the sea from this vicinity to Waikiki creek in dry seasons, is over forty cubic feet per second. The surface indications at this proposed source of supply are very favorable for abundant flow from artesian wells.”

Prof. W. D. Alexander, Surveyor-General of the Hawaiian Government, says: “In regard to the available water supply,

- the magnificent Waipahu Spring, which has not varied perceptibly during the past twenty years, will almost render its owners independent of any other source. According to the measurement made by your engineers, it pours out water enough to irrigate 3,000 acres. To conclude, the land and water supply are ample, and can be depended upon."

Mr. S. E. Bishop, C. E., says: "Your accessible water supply, from springs at sea level alone, is ample for six thousand acres. Beside this, as much more could be drawn from artesian wells, flowing thirty or more feet above sea level. Could this enormous water supply be united to the splendid lands adjacent, the result would be a magnificent development of values."

Mr. E. Kopke, Mechanical Engineer of the Hawaiian Government, in a letter to Mr. Dillingham, Manager of the Oahu Railway Co., says of the Ewa artesian wells: "All artesian wells which have been bored in this district have shown a wonderful supply of water; there are ten 12-inch wells on Ewa Plantation, all in a space of 150x100 feet, which deliver constantly, through the driest part of the year, 15,000,000 gallons per day without showing any diminution in the supply. About one-third of a mile from this station, there is another one with six wells, which delivers 7,500,000 gallons with the same results; all these wells are to the west of the proposed Oahu Sugar Company. To the east there are the wells in Pearl City and the Peninsula, which give an abundance of water. I am not able to give the capacity of either of these mills, but none of them have been exhausted by pumping. There is no reason to believe that wells on this proposed plantation will not do just as well as the ones mentioned above."

These extracts will suffice to show that in the opinion of engineers fully competent to give a decision in this matter, who have visited the locality and examined fully into the merits of the artesian water supply, there is every reason to believe that there will be an abundance for all the needs of the proposed Oahu Sugar Company. It may not be practicable to complete these extensive works at once, but the fact that they are feasible and a safe investment will insure their completion in time.

ITS LOCATION.—This grand enterprise has chiefly to do with the Island of Oahu, which has one-third of the population of the group, and the finest harbor, with all the conveniences of warehouses, docks and marine railway for repairing ships, with other facilities for commerce, and commands the bulk of the inward and outward trade of the group. The plantation, mill and settlement will be located within thirteen miles of this port, and is connected with it by rail, over which all its freight and travel will pass at a very moderate cost. The advantage of so favorable a location will be seen in case of accident, or for obtaining supplies, and cannot be over-estimated. In the vent of accidents to the mills or plantations located on other islands of the group, days intervene before the work can be resumed. The time saved in such cases is an important item, especially in the early stages of the enterprise, when changes and additions to the original plan have often been made by necessity, which no foresight could have provided for. The location selected is believed to be the only one in this group available for a large and successful undertaking such as this promises to be.

SPECIAL ADVANTAGES.—The existence of a good railway through this section of the Island of Oahu is a matter of great importance in a work of this kind. The road is constructed and in full operation for a distance of thirty-three miles from Honolulu to Waianae, near the western end of the island, and is soon to be constructed for a distance of forty miles to and beyond the north point of the island. The new plantation is thus favorably located for receiving and sending freight and supplies in either direction at a reasonable cost. This is a great advantage compared with the poor facilities possessed by some of the largest sugar estates on these islands, where the transportation of supplies and sugar is done by teams over rocky roads, or by vessels along very rugged coasts and at great expense, attended often by delays and losses. The annual saving in this item alone will amount to many thousand dollars.

AS TO THE GOVERNMENT.—The question may be asked, "What about the stability of the Hawaiian Government?" The present Government has been in existence nearly three years. It was established and is maintained by the more in-

fluent and intelligent portion of the people, including those largely engaged in the foreign and domestic trade, and in all the leading industries of the nation. Its supporters command the capital invested in sugar, rice and coffee, and control the commerce of the country, and without a doubt will remain the controlling element. Alliance with the United States has been sought, and will continue to be the paramount object, not only of those composing this Government, but also of all those who are in any way interested in promoting the leading industries of this nation. That this result will ultimately be accomplished, there is no room to doubt. Whenever such change shall be accomplished, it will add greatly to the value of every class of property here, no matter what may be the terms of the union—whether a nominal protectorate a county of the State of California, a colony, or a territory like Alaska. In either event, this group will become a part of the American union—the flag and laws of the mother country will be our flag and law, and the changed political status will be accepted and acknowledged here and the world over.

HAWAII'S DESTINY.—The insular location of Hawaii, the only important land in the central North Pacific, points to it as likely to become a very important commercial rendezvous, having trade connections with British Columbia, United States, Central and South America, Australia and the islands of the South seas, the East and West Indies and China. The Nicaragua and Panama canals, when completed, as they most surely will be, can only add to their importance.

A CABLE.—The ocean cable will soon be laid probably before the close of the present century, connecting Hawaii with the telegraphic system of America, Europe, Asia and Australia. Of this there can be no reasonable doubt, as a contract has already been signed.

BANKS.—Two first-class banking institutions have been in successful operation in Honolulu for many years, having their correspondents in every city in the eastern and western hemispheres. Remittances can thus be made to or from any part of the world. The laws of Hawaii, regulating commercial and financial transactions, are moulded after the best laws of the United States. Loans and investments can

be placed as safely here as there. American gold and silver are the basis of our currency, though a portion of the silver in circulation is Hawaiian, having been coined at the United States Mint in San Francisco, and is of the same value as American silver.

SAVINGS BANKS.—Postal savings banks have been established in Hawaii for a number of years, and furnish a safe deposit for the earnings of laborers and mechanics, whether natives or foreigners, all being placed on the same basis. This institution is well patronized, and recent statistics show that native Hawaiians have made good use of it, having an average credit to each depositor of over two hundred dollars. No better illustration could be given to show the influence of savings banks in cultivating habits of thrift among them, and shows their value as laborers.

MONEY ORDERS.—The postal money order system was introduced into Hawaii some twelve years since, and embraces every post office in the islands. By this means, remittances are readily made, not only to every town in the group, but also to every country in the postal union. It is practically the same system that is in operation in England, Europe, and America. Reference is made to it here to show the facilities established for safely and expeditiously transacting business in these islands.

CONCLUSION.—The object in preparing this paper has been to present in as brief a compass as possible, a sketch of the early history and development of the sugar industry in Hawaii, and that it has been attended with fewer disasters and risks than in most other cane-sugar countries. From the first mill erected at Koloa, there has been a gradual enlargement in the size and the capacity of the estates, and a tendency to consolidation of several, where it could be done with advantage. There can be no doubt that one large mill may be made to perform the work of several smaller mills with greater profit to its shareholders. It will readily be seen that such promises to be the result with the Oahu Plantation, when completed. The data which have been published demonstrate that the enterprise is feasible and afford ground to predict that it will be a safe and most profitable investment for all who may become interested in it.

H. M. WHITNEY.

October 1, 1895.

TILLAGE OF THE SOIL—ITS PARAMOUNT IMPORTANCE.

Questions are often asked about the application of manures to soil, especially of artificial manures. The answer to such questions from small settlers generally should be, have nothing to do with chemical manures, use the natural manures especially on the higher parts of your land, but till your land over and over again before you plant, and while growth is going on. Let *tillage* be your watchward.

Lazy people may say that there is no use in tilling, for heavy rains wash away the soil. But rain will not wash away as much as if you do not till. Tillage loosens the soil to some depth, the rain sinks in and does not carry away so much as when the ground is quite hard below. Besides tillage is always making new soil, and there is no deterioration.

In the article on "Nitrogen" in this *Bulletin*, it is pointed out what a vast amount of work is done by microbes in making bad soil into good, fit for plant food, but these microbes must be assisted by the planters to do their work.

Experiments have been carried on with various soils in different parts of France by Mr. P. P. Deherain, and his results, published in several numbers of the *Experimental Station Record* of the U. S. Department of Agriculture, show clearly the paramount importance of constant tillage. He sums up all his work in the following paragraphs:

"The experiments reported in the preceding articles clearly demonstrate that those agriculturists who have long attributed to cultivation of the soil a decisive influence on nitrification have held a correct view of the subject. This influence is, in fact, much greater than might be supposed. A soil properly stirred and aerated is capable of producing much greater amounts of nitrates than are required to sustain the most abundant crops

"The enormous reserves of nitrogenous matter which arable soils contain are therefore not destined to remain indefinitely inactive. We will not always be reduced to the necessity of paying cash down for assimilable nitrogen and of importing each year large amounts of nitrogen compounds to make up the deficiency in the production of assimilable nitrogen in the soil. Nitrogen compounds are found in pro-

fusion in the soil, and the experiments which we have reviewed show that the transformation of inert organic matter in nitrates may be greatly accelerated by cultivation of the soil.

"The most important part of the cultivation of the soil is done (in Europe) in October or November. The soil broken up by the plough and rendered absorbent, stores up the rain water of winter, which would flow off the surface of a soil hardened by dryness or compacted by rain. The first cultivation is very well performed by the plough, but this implement does not do more than turn over the sod without breaking it, and arrange it in parallel strips. There is no pulverisation, and this is an advantage if the soil is to remain uncovered during the winter, since pulverisation promotes an active nitrification, which is very undesirable under these conditions, the nitrates formed in a soil without vegetation being irrevocably lost.

"When the time of seeding approaches however, as thorough pulverisation as possible is desirable. The harrows and cultivators which are commonly used, do not answer the purpose since they stir the soil very imperfectly. Our efforts should be directed toward improving these implements in this respect. The advantage of perfect cultivation in the soil is seen among the French peasants. They cultivate their fields (with spade, fork &c.) again and again in different ways, and without knowing it, promote a very active nitrification. Cultivators of sugar beets know that the weight of roots harvested increases with the number of cultivations to which the crop is subjected.

From the earliest time cultivation of the soil has been considered as labor *par excellence*. The man who performs it, is known as "laborer." Slowly and laboriously through the ages he has perfected his implements. From the piece of wood hardened in the fire and drawn by an ass, he has passed to the plough drawn by oxen or the more powerful implement driven by steam. But further efforts are still necessary in order to utilise the immense reserves of agriculture only until we are able to find a better. The soil is a niggardly mother who distrusts her wasteful children and refuses at first to give up her treasure, but yields finally to the supreme force of the world—work."—*Barbados Gazette*.

CANE CUTTING.

A paper read by Mr. John Dymond before the Louisiana Sugar Planters' Association, October 10, 1895.

The near approach of the grinding season makes it most fit that this incident of the cane harvest should be discussed in order that we may learn to better appreciate the great expense of this single process in our cane harvest the difficulties in the way of reducing it and the failure thus far of all mechanical devices brought out for the purpose. With sugar cane worth but \$2.50 to \$3 per ton delivered to a central factory, the railroad freight charge reducing the proceeds to the lower level of \$2 to \$2.50 per ton, it becomes at once evident that this single process of our cane harvest, cane cutting, bears an unduly large relation to the total value of the cane crop.

The differences in the character of the cane crop from year to year, aside from the special differences in the same localities arising from differences in soil and in drainage, have seemed to make a difference in the cost of cutting cane unavoidable. If sugar canes average three pounds each it is evident that they can be cut more cheaply per ton than if the canes should average one and one-half pounds each. Canes of larger average diameter ordinarily weigh more than slender canes, even though the latter may average greater length.

These differences in the cost of cutting cane have diverted the attention of sugar planters from any concentrated effort to diminish this item of cost. It has been accepted as a necessary evil, and has been endured until now the low price of sugar places the whole problem of cane culture and sugar manufacture before us with the now self-evident condition that we must eliminate all avoidable cost from every process, or we must quit the business.

Few persons have any idea how much it costs per ton ordinarily to cut sugar cane. A sugar plantation consuming 300 tons of cane per day will have perhaps 150 cane cutters in the field. If any remark be made about this large number the consoling reflection is heard that many of the hands are low-priced ones, and that an average of at least three

tons per day per first-class hand is cut. A careful study of this matter for a number of years has shown that scarcely any gang of cane cutters from fifty upward will average three tons of cane per day per first-class hand, or for the same amount of money invested in lower class hands. Occasional observations may be made when it will be found that certain cutters will cut certain pieces of cane, and that an average of three or four tons per hand per day may be reached, but if the complete cane cutting pay roll be taken into consideration, and the canes that are cut and weighed be considered, it will be found that in many cases the average result does not exceed two tons of cane cut per day per hand. It is rather a startling proposition when it has so often been found that good cane cutters can cut four or five, or even six tons of cane per day. But is it not found in almost every other kind of work that some one selected laborer can do twice or thrice as much as another, and frequently twice as much as the average of any gang of laborers? It is this enormous cost of cane cutting that has been suspected by many, that has been realized by some, and that has been actually determined by few, that has led to the encouragement of inventors in the direction of producing some cane cutting machine.

Before the days of Cyrus McCormack the average old-fashioned wheat grower would have thought that it was almost foolish to speak of a machine that would cut wheat and bind it into sheaves or bundles. Today the world is full of wheat harvesters, and the bulk of the rice crop of Louisiana is now harvested by such machines. Those of us who have been identified with the sugar industry for many years feel that it is practically impossible that any machine can be invented that will satisfactorily cut sugar cane ready for the mill. Our long experience has so impressed us with the difficulties of the situation that we feel that it is practically impossible, and yet most of the startling inventions, the great inventions that have so benefited the world during this century, have been made by outsiders who have come casually into the industry with their suggestions of improvement. Whitney who invented the cotton gin and who made the American monopoly of the cotton industry a possibility

was a school teacher, without any especial education in mechanical matters or in the difficulties involved in separating the lint of cotton from its seed. Some Whitney may arise in the sugar industry who will astonish us all with the ease, simplicity and cheapness with which he will solve this problem which so distresses us today. There are today probably twenty inventors in the United States engaged in studying the problem of cane cutting by machine, but none of them has yet realized a success. The machines that have been tried have not succeeded, perhaps it would be unfair to say had failed. These reflections bring before us one possible means of relief.

It is well known that wonderful industrial results have been had by changing from time work, or day's work, to piece work. Much of the standard manufacturing work of the world is now done by the piece. Much, if not most, of the composition in newspaper offices is done by the thousand ems, and there seems no way so successful in bringing out the latent power of laborers as to pay them for the actual work done—more money for more work done, less money for less work done. The quick satisfaction that comes to the laborer with the increased compensation for his great effort leads him to its constant renewal. A few years ago a large commercial house in New York was constantly sending out thousands of circulars. They had a young man directing these circulars and he seemed to be extremely industrious to do an immense amount of work and to perform all his duties to the satisfaction of his employers. At the same time the firm desired to have more work of this kind done, and thought that it would be essential to employ an additional man. It occurred to one of the firm to speak to the young man employed in directing envelopes for these circulars, asking him if he thought he could increase the amount of work that he was doing. He said that he was willing to try, but he did not know. They, therefore, knowing his work per day, gave him a price per thousand and equal to what he had been getting, and found within a few weeks his capacity had increased at least one-half, the constant stimulus of the fact that his labor inured to his personal reward so trained his faculties as in the end to about double his capacity. A few

years ago the writer had an old negro cooper who was familiar with the manufacture of molasses barrels under the old *regime*. The change in the shipment of Louisiana sugar from hogsheads to barrels led the writer to employ this old cooper with others to manufacture sugar barrels from Western-made sugar barrel staves, heading and hoops. The old negro took up the work doubtingly, thinking that he could scarcely make a living at it, and after trying two or three days declared that it was impossible for him to do anything in that line of work; that he could only make eight or ten barrels per day which, at seven cents a barrel, was not a satisfactory compensation while field hands were getting \$1 per day. A few words of encouragement led the old negro to continue in his efforts and the result was simply astonishing. Within a month this negro was working from twelve to fifteen hours per day and was making from twenty to twenty-five barrels per day, earning from \$1.40 to \$1.75 daily wages. These results of piece work are well known to nearly every one. We apply the piece work generally in our ditching, wood chopping and such work. Our inquiry now should be why can not we apply the piece work plan to cane cutting?

An immediate answer comes that piece work in cane cutting would result in extremely careless work; that canes would be cut too high or too low; that they would be cleaned insufficiently; that they would be flung about carelessly and not arranged methodically for the loaders. Now, these are all incidents of cane cutting that are found everywhere that day's work is practiced. It is well known that cane cutting is one of the most difficult incidents in the cane growing business, and that constant supervision is absolutely essential in order to insure good results therein. I have sometimes thought that it was absolutely essential to have one foreman for every ten cane cutters; that it was almost impossible to have the canes cut sufficiently low in the ground or at the proper joint at the top; that it was almost impossible to have them sufficiently well cleaned or properly placed in the heap row. We find that we can have ditching done by contract. We simply need to carefully examine the work and not to pay for it unless it be done according to the contract. The same plan can certainly be made to apply to cane cutting,

and if the cane cutter by the development of his natural tact in cutting gain larger wages by greater effort, there will develop a willingness to cut cane as directed, and probably in the end better work would be had than what is now had under the wages system.

The great difficulty that arises in the judgment of most cane growers is to arrange some plan of cutting cane by contract or let us say by our common unit, cutting cane by the ton, which shall be satisfactory equally to the cane cutter and to the owner. If canes be straight and long a large quantity can be cut with comparative ease. If canes be crooked and short, or blown down, they are cut with greater difficulty. These difficulties seem inherent in the business, just as ditching in stumpy land is more difficult than the ordinary enlargement or cleaning of old ditches. If any plan can be devised that shall average good results that shall compensate the earnest worker for their extra efforts we may depend upon it as ending satisfactorily. To develop such a plan for consideration, without claiming that it can be made successful, but by simply saying that it ought to be made successful, the following suggestions are given: If we admit our so-called first-class hands do not cut on an average over three tons of cane per day, then we admit that cane cutting has cost us at least $33\frac{1}{3}$ cents per ton. If we should pay $33\frac{1}{3}$ cents per ton for cutting we would pay no more, we may say, than we paid last year. If we should pay 30 cents, or 28 cents, or 25 cents per ton we should be paying less than the cost of last year. Therefore, let us endeavor to adopt some figure which will be compensatory to the laborer; which will relieve us from the disastrous expense created by our large employment of very indifferent hands who do but half the work of the better ones, although hiring at the same daily wages, and then when all are working for the same compensation the true capacity of each individual will be exhibited and the average capacity of all will be greatly raised. Let us say that we are willing to pay 30 cents per ton for cutting cane thrown into heap rows. The first difficulty that presents itself is the ignorance of the cane cutters as to quantity of cane upon the land, the possible delay in hauling the cane and their ascertainment of what they have earned. It

takes quite an amount of faith on the part of an ignorant laborer in his employer to labor for an unstated compensation that he may not learn of definitely for days or weeks, and then after any peculiar delay or incidents that would account for small earnings shall have past out of mind. It would therefore seem wise to name to laborers a price for cutting cane by squares in the field. Many planters have exact surveys and know how much land they have in each square located between roads and ditches. The common plan in cane cutting is for three cutters to cut three rows together, throwing all the cane into one heap row ready for the loaders. If a square of cane should in the estimation of the owner promise to yield twenty tons of cane per acre and the square have an area of say an acre and three-quarters, his estimate of the cane in the square would be thirty-five tons. If 30 cents per ton were the price concluded upon, the cutting of this square of cane would be worth \$10.50. On the basis of three tons per day average on the gang plan, the cutting of such a square of cane would represent $11\frac{3}{4}$ days' work. On the basis of cutting two tons per day on the gang plan, which, unfortunately, is often the average work done, the square in question would represent $17\frac{1}{2}$ days' work. Now, if three reasonably good cane cutters be offered \$10.50 for cutting such a square of cane and were assured that they could make large wages if they used exceptional effort and the necessary skill, they would quickly learn to do all this and we would find that laborers to whom we paid a dollar per day in the cane harvest a year ago, and whom we propose now to cut down to 80 or 90 cents for the same work, would actually earn on the basis of 30 cents per ton a great deal more than their wages of last year, while we in turn would have our work done with reasonable cheapness and an avoidance of the annoyance that comes with unnecessarily large gangs of laborers.

It might be possible to work larger squads than three; squads of six or nine might be found who were willing to work in partnership. In my own experience the problem of cane loading seems to have been solved by working in squads of five, and the men become quite particular in their choice of comrades in the squad in order to insure a large total of

work done, and hence large pay. If squads of six or nine could be induced to work harmoniously together, then a larger area might be given, with a diminished complication in the matter of the accounts. Experience has shown, however, that large squads are difficult to maintain in harmony, and that small squads are desirable, although accounting to them becomes more complex. This matter of accounting promptly to the squads as to what they shall have earned would be easily solved in the matter of cane cutting by the price given to them in advance for the work that they had to do. They would thus know what they were working for, and would have an incentive to drive through quickly in order to earn the stated amount. It may be suggested that the planter's judgment might be defective in determining how much cane there was upon the land; that he might be at fault in naming a price; that it might be too low and unsatisfactory to the laborers, or too high and unnecessarily expensive to himself. The easy answer to all this is that the planter will become quickly conversant with the amount of cane upon the land, and just as the cane cutter will move every limb with greater celerity in order to earn more money, just so the cane planter will have his judgment educated, even by the mistakes he makes, and will quickly learn to judge with extreme accuracy the amount of cane upon any given acre of land. Of course we assume that all the cane from any given acre will be kept separate at the scales, and that the planter's judgment will be constantly corrected by the actual results as subsequently determined.

It would be a little difficult to get cane cutters to go into a cane field and cut by the ton, feeling that their work might be lost in the general chaos of work done; that mistakes were probable; that they would be lost sight of; that their work would be lost sight of, or made little of. On the other hand, if the price be named before they begin the work, they would set in far more cheerfully, and would know as they went along what relative degree of progress they were making. It has become quite common in this State, in the matter of levee building, to sublet stations of 100 feet each to just such contractors as our cane cutters would be. Each 100 feet of a public levee has a definite cross section and

definite contents, determined by the Board of State Engineers, in whom all these earth workers seem to have a most implicit confidence. If a levee contractor takes a contract to build a levee at 12½ cents per cubic yard, he may give a squad of one, two or three men a single station of 100 feet long, containing perhaps 1000 cubic yards at 10 cents per yard. The men are told that the station amounts to \$100, and they set in in earnest to earn the money, and they get it when the work is done, with the necessary advances while the work is going on. We hear of no dissatisfaction. It is a favorite plan of employment, and it would certainly seem possible for us to avail of something like it in the sugar industry, especially in cane cutting.

Some twenty years ago, feeling the necessity for some improvement in this direction, the writer made extreme efforts to have cane cutting done by contract, and organized an elaborate plan of keeping the cane cutters separate, so that it could be found just what each individual did. An elaborate system of numbering the squares and keeping the cane of each square separate at the scales was had, but it was found to be cumbersome and so expensive, and interfered so much with the freedom of hauling from any field that the overseers desired to haul from, that it was then abandoned as impracticable. It was then found, however, that good cane cutters, in long, straight canes, could readily cut six tons of cane per day, and this was done in some cane at that time for ordinary wages. The vast chasm between six tons per day possible and two tons per day actual is the chasm that we are now called upon to bridge. It has not yet been satisfactorily done, so far as is known to the writer. If these suggestions now thrown out shall lead to the solution of the problem, then good work will have been done.—*Louisiana Planter*, October 12.

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THE CORK BARK OAK.

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The Department of Agriculture will issue a bulletin before long on the subject of cork. It will advocate the culture of cork trees in this country, urging that forests of this species of oak could be established with great profit in the southern

states. Statistics show that \$2,000,000 worth of cork is imported into the United States annually. It is steadily increasing in value, fetching now eleven times the price that was paid for it in 1790. The soil of California is particularly well adapted to the cork oak, which grows there with greater rapidity than in Europe. Already about 1,000 of the trees have been planted in the San Gabriel valley. The University of California has distributed several bushels of the acorns, which, by the way, are very good to eat, tasting like chestnuts.

The variety of uses to which cork is put is extraordinary. To the Algerians it is as great a necessity as the agave to the Mexican or the palm to the Arab. From it he makes boats, furniture, saddles, shoes, horse-shoes and even clothing. Other employments for the material in southern Europe are for roofing, pails, clothes, window lights, plates, tubs, drinking vessels, religious images, fences and coffins. The waste cork from the cutting of bottle stoppers is utilized for filling cushions and mattresses, and in the manufacture of cork dust bricks, which are serviceable where great dryness is required. A very fine kind of pasteboard is made from cork, the ground substance being mixed with paper pulp and pressed to squeeze out the water. Cork waste is also used for making lifeboats, buoys, linoleum, inner soles for shoes, artificial legs and arms, "cork concrete," and many other articles in which lightness and elasticity are required.

Though of modern origin, the cork industry has attained immense importance. In the last half century the production has more than doubled. About \$8,000,000 worth of prepared cork, representing 587,000 hundredweight, was sold last year. Portugal occupies the first place as a producer, while the United States, England and Germany are the principle consumers. Spain exports vast quantities of manufactured cork for bottles. In this industry, as well as in the quality of the product, she surpasses all other countries. The world consumes annually 7,000,000,000 cut corks. The sizes and forms of these are regulated according to 150 models.

Nowadays bicycle handles, life preservers and hat linings are made of cork. The material is burned for making

"Spanish black." The waste is utilized for lining ice houses, being an excellent non-conductor, and also for packing grapes. Notwithstanding all the uses for cork waste that have been mentioned, great quantities of it have to be thrown away for lack of purposes to which to apply it. Cork dust is made to serve as a substitute for rice powder in the toilet. Tons of cork are manufactured every year into nose-holders for eyeglasses. For these the very finest quality is required. The inventor of this particular use for cork has made a big fortune out of the idea. He gets a royalty on every pair of eyeglasses thus made that is sold.

Champagne corks consume the bulk of the finest cork that reaches the market. They cost a cent apiece wholesale. This is because they have to be cut by hand. Ordinary cork that is intended to be cut by machinery is first softened by steam, so that it may not take the edges off the revolving knives. Cork thus treated does well enough for common purposes, but it has lost its elasticity, and does not make stoppers tight enough for champagne. The cutting of cork by hand is a trade requiring much skill and long experience. The knives employed are so quickly dulled that they have to be sharpened constantly by the cork cutter as he works. The great champagne houses often engage the entire output of cork-cutting establishments in Spain and Portugal.

Cork trees are raised from seed usually, the large and sweet acorns producing the biggest trees and the finest cork. Small and bitter acorns produce coarse and inferior trees. The bark product of a full-grown tree is about eighteen pounds, worth five cents a pound. The cork of commerce is not a natural product of the tree, but an abnormal development of the bark under certain treatment. Natural cork is useless for purposes of manufacture, being too coarse. Sometimes it is so woody and dense that it will not float. The wild cork or outer layer of the natural bark is removed when the tree reaches a diameter of six inches or so, leaving the interior denser and softer cork layer. The latter is called "lard," or "mother cork," and from it the cork of commerce develops.

The bark is first placed in long, rectangular vessels and boiled. The boiling closes the pores, increases its elasticity,

and renders it more supple and compact. Its specific weight is reduced, while its volume is almost doubled. Next the slabs are scraped to remove all the wood fiber. After this operation they go to a workman who trims them to proper shape and sorts them into grades suitable for different purposes.—*Washington Star*.

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EUROPEAN EMBARGO ON FOREIGN FOOD PRODUCTS.

Secretary Morton has been making a thorough investigation through agents of the Department of Agriculture in Europe to ascertain to what extent food products of the United States are being discriminated against by the Government of Germany, and finds that cattle, horses and meats, the product of other European countries, are placed under an embargo quite as strict as that enforced against the American output. The importation of Russian cattle, sheep, hogs and goats, whether for consumption or transit, is prohibited, also the transportation of fresh beef, mutton and goat meat. Prussian cities which are located near the Russian boundary line are permitted to bring in hogs from Russia for killing purposes in their city slaughter houses, but they must be slaughtered immediately.

The importation of cattle, sheep and hogs from Austria-Hungary is prohibited, except that cattle may be brought into the municipal slaughter houses of the large cities for immediate killing, provided that none may be brought in from districts quarantined on account of pleuro pneumonia, or from any of the provinces bordering on Southern Germany, or from Galicia or the Dukedom of Salzburg. Sheep are allowed to enter the German empire, but for transit only.

Regulations similar to the above are enforced against the cattle, sheep, hogs and goats of Italy, France, Belgium, Denmark, Sweden, Great Britain and Ireland. In addition, the importation of fresh mutton from Roumania, Servia and Bulgaria is prohibited, while sheep may be imported from Iceland only under regulations prescribing an inspection period of seven days.

"It will be seen," said Secretary Morton to the *Grocer's* correspondent, "that the United States is really not suffering any more than the principal countries of Europe. While there appeared to be a discrimination against us, it was our duty to do everything to remove the restrictions placed upon our commerce, but when all nations are treated alike we cannot complain of any attempt Germany may make to keep out our meat products. It is more than probable that within a few months many of the restrictions now in force will be abandoned, as they work a far greater hardship to the consumers than to the producers, without benefiting anybody."—*Am. Grocer.*

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THE DISEASES IN PLANTS, ACT OF 1895.

A Bill under the above title, to prevent the introduction and provide for the eradication of diseases affecting vegetation, and for other purposes, has been introduced in the Assembly by Mr Barlow, the Minister for Lands. It enumerates several varieties of insects, against which war is to be waged, among others the *Sphenophorus* or beetle borer of the sugar cane, and in Fungi, the parasite known as the *Bacillus vascularis*, or micro-organism of cane disease, and enacts that the Governor may from time to time, declare that the importation or introduction into Queensland of any tree, plant or vegetable, shall be either absolutely prohibited, or permitted only under certain restrictions, if in his opinion they are likely to introduce any insect, fungus or disease. The removal of plants also from any nursery, orchard, &c., may be also prohibited or restricted as above. The importation of insects and fungi, unless the consent of the Minister shall first have been obtained, is forbidden. It provides for the appointment of Inspectors, who will be selected from officers of the Customs, or other likely persons, and defines their powers, authorizing them to examine any insects, fungi, plants, packages, &c., and in the event of their suspecting such to be infected or likely to become harmful, or harboring disease, then to seize and destroy the same as they deem best. The inspectors are also empowered to enter upon any land to search for suspected trees or insects, and they may

order the owner of such land to eradicate any disease found, either by destruction of the trees or plants affected, or otherwise. Should the owner fail, or neglect to do so, then the inspector shall take such steps as may in his opinion be necessary to accomplish the desired object, and may take summary proceedings to obtain all costs and charges incurred. The inspectors are also to be protected by the Act, against any action for trespass or damage, in the execution of their duties. Persons who obstruct or impede the inspectors are to be deemed offenders, and are liable, on conviction, to a penalty not exceeding £20, with costs of the prosecution. The Governor is further empowered to make alterations and additions to the Act, when he shall judge necessary.—*Mackay Standard, Aug. 28, 1895.*

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PRICES OF SUGAR DURING PAST FOUR YEARS.

The following table gives the highest, lowest and average price of granulated sugar since 1890:

	Highest	Lowest	Average
1891.....	6 25	4 06	4 31
1892.....	5 18	4 12½	4 80
1893.....	5 62½	4 37½	5 13
1894.....	5 00	4 00	4 38
1895.....	4 62	3 94	4 30

The average cost of 89 degree test Cuba muscovado in 1890 was 4.95c.; centrifugals, 96 degrees test, 5.57. In 1891 sugar became duty free, and that year the average cost of 89 degrees test Cuba muscovado was 3.02c. and 96 degrees centrifugals, 3.40c. Since then prices have been as follows:

	Highest	Lowest	Average
1892 { 89 degrees Cuba Mus	3½	2½	2 875
{ 96 degrees Cent.....	3¼	3 1-16	3 31
1893 { 89 degrees C. M.	3½	2½	3 22
{ 96 degrees Cent.....	4½	2½	3 72
1894 { 89 degrees C. M.	3½	2½	2 739
{ 96 degrees Cent.....	3¼	2¾	3 186

The duty of 40 per cent. was imposed August 23, 1894. The lowest cost of 96 degrees centrifugals this year was 2¾c; highest, 3½c.; highest for 89 degrees C. M. was 3½c.; lowest, 2½c. The enormous production and heavy stocks, coupled with trade depression, kept sugar low in spite of the duty. There are other factors to be considered besides tariff and which are beyond legislative control.—*Am. Grocer.*

THE METEORIC HYPOTHESIS.

Prof. J. Norman Lockyer gives the following as the new points of view in the Meteoric Hypothesis which are given in the *Popular Science News*, as follows:

First.—There is the closest possible connection between nebulae and stars.

Second.—The first stage in the development of cosmical bodies is not a mass of hot gas, but a swarm of cold meteorites.

Third.—Many bodies in space which look like stars are really centers of nebulae; that is, of meteoric swarms.

Fourth.—Stars with bright-line spectra must be associated with nebulae.

Fifth.—Some of the heavenly bodies are increasing their temperatures; others are decreasing their temperatures.

Sixth.—Double swarms, in any stage of condensation, may give rise to the phenomena of variability.

Seventh.—New stars are produced by the clash of meteor swarms.

Eighth.—Cosmical space is a meteoritic plenum.

Ninth.—A new classification of the heavenly bodies, based on the varying states of a condensation of the meteoritic swarms.

Tenth.—The sun is one of those stars the temperature of which is rapidly decreasing.

Eleventh.—Many of the changing phenomena of the sun are due to the fall of meteoric matter upon the photosphere.

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NOTES ON CURING COCOA FOR SMALL SETTLERS.

The first important point to be observed when about to cure cocoa is that it must be quite ripe, but not over-ripe, says Mr. Cradwick, Superintendent of Hope Gardens, Jamaica. The pods must have attained their full color whatever it may be, but if the beans shake about easily, then the pod is over-ripe. The reason is that if the beans are not ripe, the mucilaginous matter covering the beans is not properly developed into the stage when it will readily ferment. If left to get over-ripe, the mucilage commences to liquefy.

The best vessel in which a small cultivator can ferment cocoa is an ordinary flour barrel. To prepare this for the reception of cocoa beans, first bore about a dozen holes, each half an inch in diameter, in the bottom of the barrel, then place about ten inches of banana trash in the bottom of the barrel. Line the sides also thickly with trash, and have a sufficient quantity on hand to cover the beans when placed in the barrel. When the barrel is ready, break the whole of the pods and place the beans in the barrel, covering with the banana trash. The beans must be left to ferment for two days, then remove one-third of the beans and lay them in a heap on the floor and mix them thoroughly. Remove the balance of the beans and mix them also, but do not put the two heaps together. After placing fresh trash in the barrel, put the beans which were at the top back into the bottom of the barrel and those which were at the bottom place at the top. Cover with trash in the same way as before and leave for two more days, when the beans should be treated in exactly the same way as before. They should then be left for two more days, when they are to be taken out and washed thoroughly. On the day the beans are finally removed from the barrel the work should be commenced very early in the morning, so as to get all the sun possible on the first day, for the beans mildew very quickly. They should be washed immediately they are taken out of the barrel as this helps to keep them plump.

The proper amount of cocoa to ferment in one barrel is the quantity of beans obtained from 1000 ordinary sized pods. If many more than this number are put into one barrel, the fermentation is too great and the beans turn black.

If a less quantity, say below 700 pods, are to be fermented, the green trash and more of it must be used, and a weight not exceeding twenty-eight pounds placed on the top which helps the fermentation.

When the cocoa is being dried, it is not advisable to expose it after the first two days to the extreme heat of the mid-day sun, it is better to take it in about nine o'clock and put it out again between three and four o'clock. Those who use evaporators are warned against an excessively high temperature.

Great care must be taken when removing the pods from the trees that they be cut off with a good sharp knife, not pulled off. If pulled off, the little knob at the base of the stem of the pod is injured, and the tree will not bear from the same spot the following year. If the pods are cut off carefully, the tree goes on bearing from the same spot year after year.—*Jamaica Bulletin.*

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AVOID DEBT.—I observed recently in a daily paper published in a city of ten thousand inhabitants, this statement: "There are five hundred people on the blacklist of the traders in this community." Drygoods men, grocers, butchers, milliners, all the shop keepers had combined and they made weekly and monthly reports to their headquarters of every man and woman in the community who would run a bill and then, failing to pay, would go to some other store of the same kind to run another bill. These traders refused credit to every person whose name was on the blacklist, and five hundred made one-twentieth of the whole population of that community. Though it was considered a prosperous town, there were paupers in it, the poorest people lived in comfortable homes and there was every indication of thrift in the appearance of the people and general tone of the community. As Poor Richard says again, "If you would know the value of money, go and try to borrow some."

If one will be independent in business and have a free course in the world he must be self-reliant and build up a sturdy, strong manhood. One is strong who is conscious that if all the business of the world around him should fail his possessions will abide because he has no debts to pay. A panic cannot hurt such an one except in the volume of his trade. His home will continue to be a shelter for his family and no man can touch it. His occupation may be gone for a time, but "no debts to pay" will be the sweetest song that can ring in his soul as the days and months go rolling on. Such a man is ready for the race of life when opportunity presents itself. He is a free man, and it is freedom which contributes to the enjoyment as well as to the prosperity of life. It will help to banish care and keep grief away. Above all things avoid debt.—*The Chautauquan.*