

THE
PLANTERS' MONTHLY

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

VOL. XI.] HONOLULU, FEBRUARY 1892. [No. 2.

Latest quotation of Cuban Centrifugals in New York, February 16th, 3.41c. for 96 deg. test.

The depressed condition of sugar plantation property in Jamaica may be seen from the sale of an estate of 2,144 acres for the sum of £15,750.

The reported absorption of the Philadelphia sugar refineries by the American Sugar Refining Company, generally known as the trust, needs confirmation. That this is the aim of the trust, there can be no doubt, and if so, then it will ultimately be accomplished.

The total consumption of sugar in the United States for 1891 was 1,896,157 tons, against 1,522,731 for 1890, equal to about 24½ per cent. increase. In all probability the current year will show a consumption of fully 2,200,000 tons, or more than one third of the entire sugar product of the world, and nearly equal to the world's cane sugar crop of 1891.

The question of a continuance of the bounty on American made sugar has been raised in the lower house of Congress, and efforts made to repeal the law creating the bounty; but it is probable that no action of the present Congress will interfere with that of the last Congress which decreed the payment of bounties for fourteen years.

The new crop of sugar is now arriving freely from the plantations, over 45,000 bags, nearly 2,500 tons, having come in during the past few days. The receipts for this year, since January 1, 1892, are about 28,000,000 lbs. The weather has been very wet and stormy, but has changed now for the better, and will probably continue good. The total crop of 1892 will be about 150,000 short tons, or 135,000 long tons.

This number contains several articles calculated to impart information regarding the topics to which they refer. Three of these relate to sugar and the sugar-trade in the U. S. and Cuba. The latter article (page 77) will interest sugar men, showing as it does, the details of how the sugar business is carried on there,—a statement which is rarely given in detail, as is done by this writer. The articles on the culture of nutmegs, coca and camphor trees, show that there are industries fostered abroad, of which we are practically ignorant.

The Planters' Labor and Supply Company voted at its last meeting to give Mr. A. Jaeger of this city a binocular microscope, in consideration of his valuable and disinterested services in connection with horticulture and agriculture in these islands. During the present month, Mr. W. O. Smith, the Secretary of the Company, received and has presented the instrument to Mr. J., which proves to be the finest microscope ever seen here. Mr. Jaeger well deserves the gift, which will prove a great assistance to him in his study of insect pests so troublesome to plants, their habits and natural enemies.

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AN ANTIDOTE TO THE COFFEE BLIGHT.

In this and the previous issues of the MONTHLY, we have called attention to the efforts now being made by Prof. A. Koebele to discover the enemies of insect pests that destroy fruit and other trees cultivated by man. He is now in Australia engaged in this service, with every prospect of making discoveries which will be valuable to the horticultural industry of every country. In the *Gazette* of February 16, will be found a letter from him, in which he states that he is confident that he can find and secure the natural enemy of

the aphid which attacks and destroys the coffee trees, and "which will so reduce its numbers that its ravages will not only be checked for a few years, but forever, as far as this particular insect is concerned." The fact that Prof. Koebele has already secured insects which have saved fruit trees and their crops to the value of millions of dollars in California, and to a smaller extent here also in Honolulu, is an assurance that his promise will be carried out and that at no distant day the much dreaded and very destructive coffee blight will be a thing of the past to those who secure and use the remedy.

But the main point to which we wish to call attention is the compensation that is justly due to the philanthropist who spends his years searching for and securing these natural enemies of the pests which have caused so great destruction and financial loss to the labor of man. One authority states that Prof. Koebele's discoveries have been worth millions of dollars to the people of California alone; and yet, has any adequate compensation been awarded to him for it? A homestead it is said was promised to him, but so far as we can ascertain, never given. But in place of it a gold watch was given as a reward of merit from a few admiring friends. It is a shame that in this age of abounding wealth, some fitting reward cannot be provided for him. The least that the State of California should do is to vote \$100,000, or bestow a farm of equal value to the man who has saved the people of that state millions of dollars.

And should Prof. Koebele discover an effectual remedy for the coffee blight, rendering it possible to develop the coffee industry so that it may become a national industry, giving employment to thousands of native and other population scattered throughout the group, then he will most surely have earned the lasting gratitude of Hawaii, and a pecuniary reward, commensurate with its value.

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LETTER FROM R. A. MACFIE, JR.

Caixa 112, Bahia, Brazil, Dec. 22, 1891.

DEAR MR. EDITOR:—I enclose you part of a cutting from the *Demerara Argosy*, which relates to the murder of Mr.

Lionarons. Perhaps you may have seen it, but in case not, I send it, as I think this must be the same gentleman who came to the islands from Queensland in 1883, and was afterwards head overseer at Kilauea, then manager at Reciprocity Plantation on Maui.

“News of an appalling tragedy has reached us from Surinam. A coolie man indentured to plantation Jaglust, who had been sent to gaol for a short time for some offence, vowed he would kill the manager when he got out; but no notice was taken to his threats. One day, he was seen to be taking great pains in sharpening his cutlass, and later on, Mr. Lionarons, the manager, saw the man approaching him, while he was walking along the dam quite near to the buildings and within sight of a number of laborers and two of the estate’s overseers. As soon as he was within striking distance the coolie was seen to raise his cutlass and bring it down with terrific force on Mr. Lionarons’s arm, which he had raised to defend his head. The blow severed the arm from the body. With another blow he drove the cutlass into the back of the manager’s neck killing him instantly. He then hacked the head until it was all but severed from the body; and then he walked on to meet the persons he saw running to the manager’s assistance. When they came up to him he told them there was no need to hurry, for the manager was quite dead. The murderer was taken into custody and it is certain that he will be sentenced to be hanged.”

I am spending the winter or rather the summer in Brazil, and am getting a taste of what really hot weather is, present temperature in shade being 96 degrees. Brazil politically is in rather a disturbed condition at present, but out in the country it does not cause any more inconvenience than the Hawaiian “Revolution” did on Kauai or Maui. The reports of occurrences in the city of Bahia and Rio Janeiro sound very bad at first, but when sifted do not amount to much. The governor of Bahia was forcibly ejected from his office the other day, and the first news that reached here was that, there had been a terrific fight and 200 killed. Subsequently it transpired that only one man lost his life, and that was by falling under the wheels of a tram car in getting out of the way of the crowd. Two days ago, the manager of the government railway that runs through this district, told us that Bahia was to be bombarded that day and would probably be destroyed, if the governor is not promptly reinstated. Nothing however has occurred so far. Some men-of-war and troops have I believe been sent from Rio Janeiro to reinstate the ejected governor, but the officers in charge, having

guaged public opinion, are wisely abstaining from carrying out their instructions.

The Republic formed under General Deodora da Fonseca in November, 1889, has so far proved a failure, and all classes, except the office holders and their particular friends, are dissatisfied with it. The poor people feel it most, as they have no voice in the matter, and now find all the necessaries of life doubled in price, while their wages remain the same. The mil rei, which in 1889 before the revolution, was worth 60 cents, is now only worth 20 cents.

This is a fine country for sugar cane, and its cultivation is a very important industry, though at present more successful in the Province of Pernambuco than Bahia. Why this is I don't understand. Bahia at one time exported \$2,000 tons of sugar per annum, and now the export has fallen to below 20,000 tons per annum. This is no doubt partly due to increased home consumption, of which there are no statistics. The present generation of planters seem a degenerate lot, and since the fall in price of sugar and liberation of the slaves, seem simply to have chucked up the sponge. From what I have seen of the land, the modes of cultivation and resulting cane, there seems every reason to believe that with as thorough cultivation as maintains in the Hawaiian Islands, as good results could be obtained here as there, and at very much less cost.

The price of labor here averages about twenty-five cents per day of eleven hours, most of the laborers being negroes who were formerly slaves. I have observed them very carefully and am satisfied that they work just as hard, and are just as good laborers, as the men that get seventy-five cents per day in Hawaii nei.

They build their own houses, out of poles and clay, and make themselves comfortable at very small cost. There is this further advantage about laborers here, which to my mind is a great one, they all speak a European language, (Portuguese) and can thus be communicated with much more easily and satisfactorily than Chinese, Japanese or Indian coolies can be, by Europeans, or planters of European origin. The practice here is to plant cane in May and June, at the commencement of the rainy season, and to cut it fifteen months

after, much as we do on the islands. The cane, however, rarely if ever tassels. The land is not plowed, but the weeds are hoed or burnt off, and the cane planted with a hoe in rows about three feet apart. Corn is planted or rather sown between the rows at the same time as the cane, and matures before the cane gets very high. Some people say, the value of the corn crop pays all the expense of cultivation on the cane, and it may be so, for it is mighty little after cultivation that it gets. One hoeing or at most two, and then it is left to take its chance. The average Brazillian planter would think it money thrown away to expend it stripping his cane, and considers himself an injured man in having to pay for the planting, hoeing and cutting. Under these circumstances you will be surprised to learn that the soil produces so much as 30 tons of cane to the acre. As most of the cane is ground in little mills driven by oxen, it is found more convenient to speak of tons of *cane* per acre, than tons of *sugar* per acre, and for comparison of agricultural yields it is certainly the best.

Speaking of oxen, it is a pleasure to see them work here, guided entirely by word of mouth. Gate posts are perfectly safe, and the gates I have seen are not nearly so wide as those in Hawaii. Although the cattle are good and work well, the carts are about as miserable things as you can well imagine, so that much of energy is wasted. The wheels are solid discs of wood, fast on wooden axles, running in wooden journals without lubrication. They make a sound like a Chinese fiddle magnified one hundred times, and can be heard more than a mile off. The bullock drivers say, the cattle would not pull without the music, which gives them assurance that their labor is not in vain. A Brazillian gentleman of enterprise and intelligence told me he got some wheels and axles from England, but his men struck, and refused to use them; and though he knew he could pull more than double the load with them, he had to give in and be content to keep them as curiosities. All the cane is brought to the Argenios in a bullock carts, and the sugar is generally taken away on pack mules.

Please excuse this hasty letter. If any extracts would interest readers of the PLANTERS' MONTHLY, you are at liberty

to make use of any part you like. At another time I may perhaps be able to send you some notes about the Argenios.

Faithfully yours,

R. A. MACFIE, JR.

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SUGAR SUPPLIES FOR 1892.

It will be noted from Mr. Licht's figures that the amount of sugar available for export to September, 1892, is 218,494 tons less than last year, which is about the quantity sent to the United States January 1 to Sept 1, 1891. The question arises, can the United States do without this amount of sugar from Europe in 1892? It is certain that the United States will require fully as much sugar as last year, and it is certain that 200,000 tons more sugar than last year cannot be had from cane countries. Europe must eventually let us have at least one-half the amount we received last year, and we will begin to take it just as soon as beet sugar prices are on a parity with Cuba quotations. As our reciprocity treaties stand now, only German sugars can come in free of duty, for not above No. 16 D. S. in color, after the President's proclamation is issued on March 15th. The large stock of sugar in Hamburg, 119,100 tons, consists of about 2,000 tons granulated and balance raws.—*Willett and Gray's Circular.*

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WHAT ARE THE PROFITS OF SUGAR REFINERS ?

In an article commenting on the business of the American Sugar Refining Company of New York, in 1891, *Willett & Gray's Sugar Journal* says :

"The American Sugar Refining Company's report shows that they earned \$5,073,002. If our estimate of tons melted is correct, their earnings were at the rate of \$4.30 per ton on 1,180,990 tons, or say .192c. per lb. average net profit on refining. The difference between the average prices of Centrifugals and Granulated in 1891, was .73c. per lb., which allows .538c. per lb. for average cost of refining. If the outside refineries made the same rate of profit on their meltings of 630,004 tons, say \$4.30 per ton, they made \$2,709,017 net profit in 1891. If \$50,000,000 capital earns \$5,000,000, or 10

per cent., then refineries which earn \$2,700,000 may be valued at \$27,000,000 on the same basis. The outside refineries comprise the Franklin Sugar Refining Co., the Spreckels Sugar Refining Company, E. C. Knight & Co., the Delaware Sugar House, the Revere Sugar Refinery, and the Baltimore Sugar Refining Company, and one-half of the Western Sugar Refining Company, with a refinery building in Brooklyn of 1,500 barrels daily capacity. The total value of refineries in the United States on basis of earning capacity of 10 per cent. is \$77,000,000, and doing a business of say not less than \$150,000,000 per annum. The present value of the \$25,000,000 new stock at say \$80 would be \$20,000,000, which, with the \$10,000,000 bonds in the treasury, gives \$30,000,000 available. A profit of $\frac{3}{8}$ c. per lb. can be taken by refiners before foreign sugars can come in competition. 1,800,000 tons meltings at that rate would give \$15,000,000 profit on refining, while the absence of competition for raw sugar would so reduce its cost that consumers of sugar in the United States would pay but little if any more for refined than at present, and they are now buying refined at as low cost compared with raw sugar as ever known before in the United States even under the ruinous competition which existed before the Sugar Trust was formed.

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PURITY OF CANE SUGAR.

Some interesting results of the analyses of sugars and molasses as made at the laboratory of the Inland Revenue Department are furnished through the *Monetary Times*. The assistant of the chief analyst has investigated a hundred samples of sugars, syrups and molasses more minutely than the official analysts in the different districts. Of white sugars there were 21 samples; yellow, 22; syrups, 26; molasses, 31. The report states that the percentages of cane sugar contained in the white or granulated class vary from 98.4 to 99.8; the average is 98.26. There is no adulteration, and, indeed, as has been remarked before now, these sugars are probably among the purest food substances in commerce. The yellow or brown sugars vary from 86 to 94.9 per cent. of cane sugar; average, 90.23. No case of adulteration has been detected.

CORRESPONDENCE AND SELECTIONS.

THE BOUNTIES ON SUGAR.

POWERFUL STIMULUS TO DOMESTIC PRODUCTION—WHAT TAX-PAYERS AND CONSUMERS WILL SAVE.

The Commissioner of Internal Revenue is absent from Washington on an official tour of inspection through the cane sugar producing regions of Louisiana, Texas and Florida, whither he has gone to observe the workings of the sugar bounty system which is now in operation for the first time in the United States, under an act of Congress. For several years the States of New Jersey and Kansas paid a bounty to the producers of sorghum sugar, with a view to encourage and promote the establishment of that industry, which was then in an experimental stage. The efforts in that direction have been measurably successful in the latter State, with the aid and co-operation of the Department of Agriculture and the expenditure of large sums of money appropriated by Congress for experiments both in the cultivation and testing of different varieties of sorghum cane, and in improving the methods and processes of manufacture. The General Government has likewise aided in similar manner the efforts to establish the beet sugar industry in the United States, and these efforts have met with gratifying success.

The growth of the beet sugar industry in the United States during the last four years has been phenomenal, and there is reason to believe that, under the stimulus of the bounty system, the increase during the next four years will be still greater. In 1887 the total production of beet sugar in the United States amounted to only 400,000 pounds; in 1888 the total had increased to about 3,600,000 pounds, and in 1889 to about 6,000,000 pounds. In 1890 three factories were in operation—two in California and one in Nebraska—and the total output was about 8,000,000 pounds. This year the number of factories has been doubled—there now being three in operation in California, two in Nebraska and one in Utah—and it is estimated that the total production will amount to about 25,000,000 pounds, distributed as follow: California,

13,000,000 pounds; Nebraska, 6,000,000 pounds; and Utah, 6,000,000 pounds. If this estimate is realized the bounty paid on beet sugar this year will amount to \$500,000. The best samples of American beet sugar deposited in the office of the Commissioner of Internal Revenue are much superior, both in appearance and saccharine qualities, to the best samples of cane sugar or sorghum sugar which have been received. One sample, which is of the purest white, polarized at $99\frac{1}{2}$ degrees.

The distribution of the beet-sugar factories now in operation under the Bounty law, and the number of acres of beets upon which each has to draw, are as follows: Utah Sugar Company, Salt Lake City, 2,000 acres; Alameda Sugar Company, Alvarado, Cal., 1,000 acres; Western Beet Sugar Company, Watsonville, Cal., 2,500 acres; Chino Valley Beet Sugar Company, Chino, Cal., 2,500 acres; Oxnard Beet Sugar Company, Grand Island, Neb., 2,500 acres; Norfolk Beet Sugar Company, Norfolk, Neb., 2,500 acres; total six factories, 13,000 acres. Two other beet-sugar companies—one in Pennsylvania and one in Virginia—obtained licenses, but their operations this year have been merely of an experimental nature, and therefore they will not participate in the distribution of the bounty. The first sugar company to begin operations under the new law was the Chino Valley Beet Sugar Company, which began August 20, 1891. The same company filed the first claim for bounty; it was received by the Commissioner of Internal Revenue on October 1, 1891. The world's production of beet sugar at the present time is about 50 per cent. greater than the total production of cane sugar, and of the total imports of sugar into the United States during the last two years about 20 per cent. consisted of beet sugar.

Unlike the beet sugar industry in the United States is that of producing sugar from sorghum cane; the former has been established in several countries of Europe on a commercial basis for more than three-quarters of a century, and growers and producers in this country have thus been enabled to draw upon the results of long and successful practical experience, for the best varieties of seed, the best methods of cultivation and the best processes and machinery for manufacturing

purposes. The latter industry is an entirely new one. Many and expensive experiments were necessary to determine which were the best varieties of cane, the most suitable soil and climate, the best methods of cultivation, the best machinery and most profitable and economical processes of manufacture; in fact much of the machinery had to be invented as well as manufactured, and many of the processes of manufacturing sugar from sorghum cane had to be discovered before the new industry could be established on a stable and profitable basis.

It is estimated that the total output of sorghum sugar this year will amount to 2,000,000 pounds in the three Kansas factories which will participate in the distribution of the sugar bounty. If this estimate is realized, the total amount of bounty to be paid on sorghum sugar will be \$40,000, as all of that kind of sugar will polarize at or over 90 degrees. Three other sorghum factories—one in Michigan, one in Missouri and one in Minnesota—applied for and obtained licenses under the bounty law, but the first two will not manufacture sugar this year and it appears to be doubtful whether the one in Minnesota will do so. The first sorghum factory to begin operations under the new bounty law was the Medicine Lodge Sugar Works and Refining Company of Kansas, which began August 31, 1891.

The total number of sugar cane factories licensed under the bounty law is 733, distributed as follows: Louisiana, 702; Florida, 15; Texas, 15; Mississippi, 1. The total amount of cane sugar produced in the United States in 1890 was about 436,000,000 pounds. The acreage this year is greater than it was last year, and early in the season it was estimated that the total yield would amount to 450,000,000 pounds. The latter part of the season, however, has been less favorable than it was in 1890, and it is now thought that the total output will be about the same as that of last year, 436,000,000 pounds. Of this it is estimated that about two-thirds will polarize at or over 90 degrees and earn a bounty of two cents a pound, while one-third will polarize at more than 80 and less than 90 degrees, and earn a bounty of $1\frac{3}{4}$ cents a pound. The first cane sugar of the new crop was received at New Orleans, October 9, and the first claim for bounty paid was

that of B. W. Dougherty & Co., of New Orleans. The draft therefor was issued by the United States Treasurer, October 30, 1891, and the amount was \$1,319.20.

It is estimated that the total amount of maple sugar produced in the United States annually is about 50,000,000 pounds. The total number of licenses applied for and obtained for the manufacture of maple sugar under the bounty law is 4,159, covering a total estimated production of 10,000,000 pounds, or one-fifth of the estimated total output for the coming year.

The total amount of bounties to be paid on sugar prior to July 1, 1892, if the foregoing estimates of production are found to be correct, will be \$9,071,666.67, apportioned as follows: Cane sugar, \$8,356,666.76; beet sugar, \$500,000; maple sugar, \$175,000; sorghum sugar, \$40,000. Down to date thirty-nine claims for bounty have been received by the Commissioner of Internal Revenue. The total amount of these claims is \$137,000.

At the old rates the duties on the total importations of sugar for the current fiscal year, taking the figures for the quarter ended on September 30, as a basis for the entire year, would have amounted to nearly \$60,000,000, or more than six times as much as will be paid in bounties on the most liberal estimate of production. As everybody knows, and as most persons admit, the duty on sugar, unlike most tariff duties, was strictly a revenue duty and was paid by the consumers, who thus bore a burden on that account more than six times as great as that which they now bear under the system of bounties established by the last Congress. There is no reasonable ground for doubt that this policy, if maintained during the next five years, will result in an enormous increase of sugar production in the United States and make this country virtually independent of foreign countries in that respect.—*New York Tribune*.

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COCA FROM WHICH COCAINE IS EXTRACTED— HOW THE PLANT IS CULTIVATED.

One of the most important industries of Bolivia, as well as of Peru and Ecuador, is the cultivation of the plant known to

science as *erythroxyton coca*. For many years past Bolivia's crop of dried coca leaves has averaged a trifle over 7,500,000 pounds. Of this vast amount fully fifty-five per cent. is consumed at home by the native Indians. About thirty per cent. of the remainder is divided equally between Chili and the Argentine Republic. Peru gets 10 per cent. of it; Europe 5 per cent., and the United States none at all.

Since alkaloid cocaine has lately come into general use for producing local anæsthesia the demand for the coca leaves from which it is made has greatly increased, though without sensibly affecting the markets of South America. Soon as the application of cocaine to surgical uses became common the British government sent out a commission to collect the plants and transfer them to India, and already the plantations of those far-off colonies are yielding so profusely that they furnish plenty of leaves for the German manufacturer who supplies the world with most of the cocaine that is used.

It must be remembered that the cocoa palm, the seeds of which furnish the chocolate of commerce, and the coca plant from which cocaine is made, are not related to one another in any way, but belong to different branches of the vegetable family. *Erythroxyton coca* is not a tree, but a small shrub, growing from two to five feet high. It flourishes best at an altitude between 3,000 and 6,000 feet above the sea, in sheltered places where the climate is warm and moist without excessive heat. In this country it attains its greatest perfection in the Province of Yungas, where the mountain ridges, crossing in every direction, leave deep hollows and narrow valleys between, giving all varieties of climate with the productions peculiar to each. That section not only produces the best coca in the world, but vanilla and chocolate beans, sarsaparilla, coffee, quinine, oranges, figs, bananas, grapes, apples, pears, peaches, plums, strawberries, quinces, cherries, chiremayas, mangoes, apricots, sugar-cane, corn, wheat and barley are gathered from the cooler heights, the sunny hill-sides and the lower villages.

A good deal of coca is also grown in Peru in the neighborhood of Cuzio; but it is of inferior quality, as the hot, dry atmosphere thickens the leaves and destroys their delicate flavor.

The lower mountain side of the Yungas and other valleys are laid out in terraces, each terrace about a yard wide and well supported by a wall of stones, in which the little coca bushes, closely resembling tea plants, are set at regular distances. The seeds are first sown in beds, and when the plants are a few inches high they are transferred to the terraces. No fertilizers are used, but great care is taken that no grasses or other growths are allowed to spring up with the coca.

Each bush yields three generous crops of leaves in a year, and sometimes four, where the conditions of soil and climate are peculiarly favorable. Each crop is called a *mita*. The first, known as the "Marzo mita" (March crop), is generally picked in January; the second, or "St. John's mita," is gathered in May; and the third, or "All Saints' mita," in October. The harvest time, however, is by no means uniform, depending greatly on the weather; the rain and other accidents.

The crop is gathered by Indian women, who pick it leaf by leaf, squatted upon the ground in front of a bush. It is slow work, because the tiny leaves must not be broken or the central fiber torn; and it is believed that if the apex of the plant is touched, or if any animal brushes against it, all the leaves will instantly wither.

Following the women come men with large sacks, who collect the gathered leaves and carry them to the *cachi*, the coca-yard, to be dried. The *cachi* is enclosed by a wall and paved with flat stones that are kept perfectly clean. The morning sun striking down on these stones, heat them so that when the leaves are spread smoothly over the surface they become perfectly dry in a few hours. Then they are re-collected, more carefully than ever, having now become somewhat brittle, and carried to the press, the latter being a primitive machine, with a crossbeam made of the hard wood of the country. When completely dry the leaves will retain their bright green color, even after having been packed for months.

The press has a box which holds precisely 25 pounds. A lining of dried banana leaves, soft as silk yet strong as leather, is put into the box before the coca is poured in. When turned out of the press the package is called a *certa*; and two *certas*, 50 pounds, when lashed together, form a *tambo*, or "drum." The latter is wrapped in course sacking and more

banana leaves, and makes a bundle which measures about three cubic feet. In this shape it is toted over the mountains to La Paz, on mule or llama back, to be deposited in the *Adriano de coca*, or coca custom house.

After a picking season the roads leading out of the valleys are literally filled with beasts of burden laden with coca, and troops of Indians on their way to town to sell the fruit of their labors, or on the way home, generally empty-handed but in a state of jolly intoxication, the women out-doing the men in their enjoyment of the spree—singing, dancing, howling, like so many lunatics, but always docile and respectful to the superior race, though they occasionally indulge in a little hair pulling among themselves.

Thus the whole coca crop grown in the lowlands must pass over the great Cordillera, to a height of nearly 17,000 feet, before it can reach a market. A good deal is ruined in transit, when not sufficiently protected, as the least moisture, such as the usual snow storm to be encountered in the upper heights, rots the delicate leaves and destroys their cocaine properties. That which is exported from Bolivia is re-wrapped at the Adriano in bales of 150 pounds each, covered first in rawhide, then with strong cloth and a thick coating added of some resinous gum. Two of these bales, or 300 pounds, is considered a mule-load for the long hard journey between La Paz and the sea.

The average price of coca to the producer is twenty-two cents (gold) per pound; but out of this he has to pay a tax of 24 centavos (about thirteen cents gold), on every pound. Think of cultivating, picking, drying and packing the tiny leaves for that small profit, to say nothing of carrying them several days journey over the mountains!

The government derives no small share of its revenue from the coca business. The right to collect the tax is "farmed out," or sold to the highest bidder, sealed proposals being received for the privilege. The contracts are given for one year only, running from the 11th of June to the 10th of the following June. A greater part of the tax goes into the public treasury and the balance is used for improving the rough roads over the heights and down into the valleys where coca grows. A late contract was bid for 235,880 bolivianas; of

which sum 215,500 will go to the government, leaving for the road commissioners 20,520 dollars of the country.

At least 75 per cent. of all the coca that is raised in Bolivia is brought to La Paz under these contracts; the remainder being sold by middlemen to the residents of adjacent villages on the great Andean plateau. The manner of tax-collecting in Yungas is a fair sample of the mode throughout the country. Tanacachi, a village near the western terminus of the valley, lies in a narrow canyon between impassable mountains, through which there is but one road. All the streets of the town, except that one leading into the canyon road, are securely walled up just outside the suburbs; so that all cargo must pass by way of the custom house, which stands at the head of the canyon.

Whenever an Indian passes with a pack on his back or a load on his mule, if he does not stop and show what he carries, or pay the tax if it be coca, he quickly finds himself in trouble. Out rushes a custom's official, armed with a long iron poker which has a screw-like apparatus at one end and a heavy rawhide whip attached to the other. The screw point he thrusts deep into the middle of the cargo to determine if any coca may be hidden within it; and should the Indian resist he does not hesitate to use the whip on his back, *ad libitum*.

The principal consumers of coca in Peru and Bolivia are the Quichua and Aymara Indians. In the tombs of the ancient Peruvians there may always be found buried with the mummy a small quantity of coca leaves, together with an earthen vase or jar that once held lime or potash. To this day potash is eaten with the coca. It is made by incinerating the root of a weed which is indigenous to the soil where coca grows, or from the bark of a species of wild bean, of which the Indians are very fond.

The whites and cholos (half-breeds) seldom use coca at all, except sometimes as an infusion in cases of debility. The infusion is made in the same manner as tea, except that the first water is thrown away, being too strong and bitter. The second steeping is not disagreeable to the taste and is extremely exhilarating. A species of wine is also being made for medicinal purposes—comparatively a new invention, whose beneficial effects remain to be proved.

The increase of one's powers of endurance by the use of coca leaves, especially in the higher altitudes, is something marvelous. Aside from relieving *sirroche*, the distressing difficulty of breathing incident to exercise in the thin air of the Andes, it is said to completely abolish all sense of hunger or fatigue. It is an undoubted fact that an Indian, when well supplied with coca, will travel from fifty to seventy-five miles a day, carrying on his back the load of a llama, almost without food for days together. Indeed he considers food as of secondary importance, or rather as third on his list of necessities, diluted alcohol coming next to coca. All the Aymaras and Quichuas, male and female, use incredible quantities of both alcohol and coca, while their allowance of food is extremely small, the menu being limited to but two or three edibles from one year's end to another. That the women consume even more than the men is perhaps no more than fair, since the former do all the hardest work and earn most of the money.

The laborers of this country are universally Indians, and all employers must furnish a certain amount of coca to each man, or he will not work at all. In the mines, the least allowance per diem is five ounces for every man, and eight ounces is sometimes given. Thus supplied, an Indian will work willingly and well from 4 o'clock in the morning until 7 p. m., taking nothing to eat in the meantime. He generally has food of some sort before beginning his labors, and after 7 in the evening he eats whatever he can get.

His first cud is accumulated in about two hours, from 4 to 6 o'clock, taking it leaf by leaf, stripping the central stem between his teeth, and from time to time adding a few grains of potash. This alkali causes a burning sensation on the lips, but is soon incorporated with the cud, serving to neutralize the acidity of the leaves and at the same time aiding digestion by provoking an increased flow of saliva.

At 10 a. m., the employer gives him half an hour of rest. He then throws away the morning's chew, rinses his mouth with alcohol, and industriously begins the accumulation of a second cud. Again, at 1:30 o'clock, another rest is given which he employs in making a third chew. At 3:30 the same performance is repeated.

He still has a little coca left for the evening, and if the day's allowance has been generous enough, he will keep himself awake and garrulous all night. Many Indians get credit against coming wages for a greater amount of coca than the employer feels disposed to furnish gratis ; and if they can add to it some forty per cent. of alcohol, their bliss is complete.

Strange to say, the most inordinate use of coca is not followed by delirium, tremens, nervousness, or any other effect that may be noticeable on an Indian, even after he has lived on it for two or three days, taking little or no food and enduring excessive fatigue. Whenever opportunity offers, he will eat the back numbers of omitted meals in one gigantic heap, thus showing that no serious disturbance of the stomach has arisen from his coca intoxication. Neither does its habitual use seem to affect longevity, unless it may be to prolong it.

One never meets a toothless or baldheaded Indian, though 100 years is here considered their average span of life. There is a cheerful Methuselah in Chuquibambilla who claims to have just turned his 142d year, and the parish priest supports his statement by the church record of births. This aged Indian does not look any older than his great-grandchildren, and declares that for more than ninety years he has not tasted water or any liquid whatsoever but *chicha*, the native intoxicant made from fermented corn ; that he has eaten coca three times a day since he was 10 years old, and has seldom had animal food except on Sundays, sometimes having no meat at all for months together, but subsisting entirely on corn, barley and *quinua*.

On this subject Mr. Stevenson writes : " Instances are not rare of Indians who attain 130, and even more years of age, yet retaining full possession of their bodily and mental powers. On examining the church register of Barranca, I found that within an interval of seven years eleven Indians had died, whose united ages amounted to 1707 years, or an average of 109 years each. The Indians retain their teeth and hair to extreme old age, and it is remarkable that the latter never becomes white, and seldom gray. In the year of 1839 there was living in the valley of Jauja an Indian, who, according to the baptismal register, was 147 years old."

No doubt the aperient qualities of coca tend to prevent disease, and are most useful in counteracting the obstructions caused by a diet of farinaceous food alone. One cannot find an Indian anywhere in Bolivia or Peru who has not his *huallqui*, or pouch, of coca. The leaves are retailed in every little tienda in quantities to suit the purse of the purchaser, and on "beggar's day," (Saturday), a handful of coca is more gratefully received by the poorest mendicant than if every leaf were silver coin.—*S. J. Mercury.*

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GROWING CAMPHOR TREES.

BY L. J. VANCE.

The steady increase in the price of camphor directs attention to the various efforts that have been made to domesticate the tree of China and Japan in the United States. Several explanations have been given to account for this advance. One theory is that manufacturers of smokeless powder have used immense quantities of camphor; another is that makers of celluloid goods have taken the surplus stock, and more too; a third explanation is that the supply of camphor and the growth of the trees in Southern Japan have decreased of late years. Whatever the cause may be, the fact remains that the price of gum camphor is now double what it was ten years ago.

The cultivation of the camphor tree in this country is no new thing. Ever since the establishment of the Department of Agriculture these trees have been distributed yearly to a greater or less extent. But it is only within the last four or five years that camphor trees have been sent out in large numbers. Mr. William Saunders, Superintendent of the Gardens at Washington, D. C., states that the distribution has averaged 3,000 plants annually. Last year something like 5,000 plants were distributed by the Department of Agriculture. So it would seem that the high price of camphor has had the effect of redoubling previous efforts to domesticate the tree in suitable localities.

The camphor tree flourishes well in several regions of the United States. It grows to a considerable size and beauty in those Southern States that border on the Gulf. In fact, most

of the trees have been sent to Florida and Texas, where they answer a good purpose as shade trees. Thus far little effort has been made to extract camphor from the branches for commercial purposes. Another region where the camphor tree flourishes is in California, especially along the Pacific Coast. Many of the trees sent out there years ago have grown very rapidly, thus, in Yuba County, in fourteen years, a tree attained to a height of fifty feet. The camphor tree is an evergreen, and, on account of its beauty, it will have its use as a shade tree. Besides the especial advantage of the tree for ornament alone, so botanists say, is its exemption from insect parasites, which in the coast regions bother all our indigenous evergreens and stunt their growth.

The camphor tree stands the coast climate as far north as Carolina. Some years ago a large number of trees were raised in the gardens at Washington from seed sent from South Carolina. The seeds are often sown in the garden border, and in the first season will reach to a height of from eighteen to twenty-eight inches. The plants are raised in the nurseries of the Department. The camphor tree will stand a good frost without injury; no place where the thermometer falls below 20 degrees Fahrenheit, is fitted for the growth of this tree.

The ulterior motive in domesticating the camphor tree in the United States is, of course, with the idea of extracting gum for commercial purposes. The supply of trees is yet too limited to try the experiment on a commercial scale. The Japanese method of extracting the gum from the wood has been described briefly as follows: After a tree is felled it is cut up into chips, which are laid in a tub or a large iron pot, partially filled with water and placed over a slow fire. Through holes in the bottom of the tub steam slowly rises, and, heating the chips, generates oil and camphor. From the close-fitting cover over the tub, a bamboo pipe leads to a succession of other tubs with bamboo connections, and the last of these tubs is divided into two compartments, one above the other, the dividing floor being perforated with small holes to allow the water and the oil to pass to the lower compartment. The upper compartment is supplied with a straw layer, which catches and holds the camphor in

crystal in deposit as it passes to the cooling process. The camphor is then separated from the straw, and packed in wooden tubs. This is said to be a slow and wasteful method, and, if only to show American enterprise and ingenuity, we might mention that, last year improved machinery for distilling camphor was shipped from Pittsburgh to Hiogo, Japan.

The Department of Agriculture will soon have several thousand plants to distribute among individuals who reside in regions where the trees are likely to flourish, and who may apply for them.—*Ex.*

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FACTS ABOUT NUTMEGS.

Of the different varieties of nutmegs met with in commerce, those which are known as "Penang" are considered to be the most valuable. Next to these rank the Dutch or Batavian kind, and after these the Singapore nutmegs. Buyers may distinguish between varieties by attending to their external characteristics. The Penang nutmegs are placed upon the London markets in their brown condition, and are free from any coating of lime. The Dutch or Batavian variety is always limed; it is not in much request in this country, but the prejudice in favor of liming is so strong in some countries that the fine unlimed Penang nutmeg does not command anything like the price it deserves. The liming of nutmegs is a practice which years ago originated among the Dutch colonial merchants. They used to break the shell and then immerse the kernel of the seed in milk of lime—sometimes for a period of three months. They thought that this treatment would prevent the seed from sprouting out on the journey to the European markets. Liming spoils the nut from a hygienic and chemical point of view, and necessitates a second drying process. As a matter of fact it is unnecessary to dry ripe nutmegs, and the Chinese show their good sense by preferring them in their natural condition. Nutmegs belong to the botanical family of *Myristica*. The Penang nutmeg, which is the most fragrant species, is the *Myristica fragrans*. It grows on a tree from forty to forty-five feet high, resembling in appearance the common standard pear-tree. The tree is, like most of the spice-bearing trees, an

evergreen ; it is found wild in the small volcanic island group of Banda, Ciram Bouro, Halmahera, the Western peninsula of New Guinea, and in many of the adjacent islands. But the nutmeg tree is amenable to cultivation, and has been introduced in many countries where the climatic conditions have been found favorable, so that it may now be found in Sumatra, Malacca, Bengal, Singapore, Penang, Brazil, and the West Indies.

A good nutmeg fruit may be thus described : It is smooth externally, and pear-shaped, being about the size of a peach. There is first an outer covering, called the pericarp, which is arranged like two valves ; then there is a second covering, called the mace—a substance with which every grocer is familiar (this when fresh is of a scarlet color). Thirdly, there is the seed, commonly called the nutmeg. This again is enclosed in a double-coated shell ; the outer coat is hard and smooth, while the inner coat is thin, and branches deeply into the substance of the kernel, forming the curious and ridge-like markings. The nutmeg which we have thus described is known in commerce as the true, round, or “female” nutmeg. The wild nutmeg, which has a much more elongated kernel, is called the false, wild, or “male” nutmeg, and is the produce of another species called the *Myristica fatua*. There is also another wild nutmeg, called the *Myristica Malabarbarica*. A nutmeg tree in its native district yields three harvests, namely, one in July or August, a second in November, and the third in March, or in backward seasons in April ; but in Bencoolen the trees bear all the year round. Nutmegs are prepared either by simple drying in the sun, or by smoke-drying on hurdles over wood fires, or by steeping in milk of lime. As soon as the kernels rattle in their shells, they are ready to be packed for export.

Many traders now, either for pleasure or for profit, or both combined, are becoming adepts with the microscope. There is little to learn in manipulating this interesting instrument, but much to be learned from it, which in many cases proves to be of great value in making purchases. For the benefit, then, of our “scientific” readers we give the chief characteristics of the nutmeg as it appears in thin slices beneath the lens of a microscope. A tranverse section shows that the

inner seed-coat penetrates a long way into the substance of the kernel in narrow fibres reaching sometimes to the very centre. This imparts the well-known marked appearance in a cut nutmeg. The cells are minute and angular; those which form the white part of the seed are opalescent in appearance and contain globules of oil. Much starch is present in the form of rounded granules marked with a deep central depression. The cells in the colored part of the seed contain no starch and very little oil. The shell or testa consists mainly of long, thin, radially arranged cells closely interlacing each other, and possessing no distinct cavities. The coating which closely invests the kernel contains reddish-brown cells and small scattered bundles of vessels. These characteristics are very unique, and would, if need be, easily enable an observer to distinguish between nutmeg powder and any powder used for falsification. The microscopic test might even be used for determining approximately the extent of the adulteration. The kind of sophistication which we have to look out for in England is chiefly of the following nature: There is an insect called the "nutmeg insect," which infests the nuts and riddles them with tiny holes, abstracting all the aromatic principle and rendering the fruit worthless. These nuts thus spoiled are "faked" up for sale by smearing their surface with flour, oil, and the powder of nutmegs. These are then mixed with good fruit. This falsification can easily be detected by placing a sample in water for a time, when the "faked" nutmegs will become covered with a glutinous paste, which on being wiped off will reveal the surface of the nut deeply pitted with holes. Worm-eaten nuts often have a mouldy odor.

Finally, nutmegs yield a valuable volatile oil; this can be extracted by a process which leaves the nutmeg intact, but impairs its value and quality, since its flavor depends upon the retention of this volatile oil. Good Penang nuts are sometimes adulterated with these worthless nuts from which the oil has been extracted; the worthless may be distinguished by first observing that they are much lighter than the genuine article, and then, for corroborative evidence, examining the surface. Here a pocket lens will be found serviceable; close examination will reveal the fact that the nuts which have

been robbed of their oil have their surface covered with little punctures. The chemistry of nutmegs is distinctly interesting from a scientific point of view, but for our purpose it may be very briefly dismissed. The following is Bonastre's analysis: Volatile oil, 6.0; liquid fat, 7.6; solid fat, 24.0; acid, 0.8; starch, 2.4; gum, 1.2; woody fibre, 54.0; loss, 4.0; total, 100.0. The woody fibre is thus seen to compose more than half the fruit. The fat comes next in importance; this is known in commerce under the incorrect name of oil of mace. The taste and smell of nutmegs are due to the 6 per cent. of volatile oil; this consists, according to Cloetz, almost entirely of a hydrocarbon, namely, $C_{10}D_{16}$, to which Dr. Gladstone assigned the name myristicene. True oil of nutmegs can be distinguished from the false by examining it with a ray of polarized light in a polariscope; the former deviates 15.3 deg. to the right, while the latter deviates 28.7 deg. to the right. Substances called myristicol have also been discovered in nutmegs. The acid which is present (in very small portion) is called myristic acid. The nutmegs of English commerce are nearly all brought over from the Banda Islands, where they flourish under the shade of the lofty *Canaria communis*. Everyone is familiar with their uses, but one use has not yet been imported, which it might be well to consider: In the Dutch East Indies they are preserved in syrup, and are esteemed a delicious conserve.—*London Grocer*.

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PROGRESS OF THE CANE SUGAR INDUSTRY.

The *Journal des Fabricants de Sucre* of the 16th of September contains an article on the above subject, by Mons. B. Dureau, written with his usual ability and grasp of facts, and we have thought that a translation would be useful to those of our readers who are not conversant with the French language. That the production of cane sugar has not kept pace with that of beet is too well known to most of us; that it has not fallen off is a gratifying proof of the vitality of the industry, and we may be sure that whenever prices shall admit of a rather better profit, the stimulus thus given will quickly result in the more general application to the cane of improved methods of extraction. The only question is

whether the increased consumption all over the world, which may certainly be expected, will at all overtake the production. The great increase in the United States in this direction is on a par with the rapid rise in consumption which took place in England along with the abolition of taxation, and we may be quite sure that any fiscal measures in Germany, France, or any other similar European country, which shall bring about a reduction in price, will at once be followed by rapid increase in consumption. The world needs sugar more and more as an essential element of nutrition, an indispensable article of food, and we have by no means reached the possible limit of production either in the case of cane or beet sugar, certainly not as regards the cane. The following is the article in question :

“The legendary rivalry between cane sugar and beetroot, the contest which exists between these two plants, developing themselves under such different circumstances, has long ago attracted the attention of economists, who frequently ask themselves the question which of the two will be victorious. The statistics show us that the fears entertained with regard to cane sugar were not justified, and that although the European beetroot has gained much ground in later years, its foreign rival has never lost but has kept its position, which is being strengthened every year. The total production of cane sugar (leaving out that of the East Indies and the non-exporting countries in general, respecting which we have only insufficient statistics) is at present 2,600,000 tons, against 3,600,000 tons of beet, and some countries, such as Java, Cuba, Louisiana, appear in a position to be able, very shortly, to increase their production in a considerable proportion. The other countries, such as Brazil, the Philippines, the Sandwich Islands, Central America, South Australia, Texas, Florida, Argentina, Madagascar, and Egypt are also able to cultivate cane sugar with success, and there is no possible doubt that these countries which are in want of capital or labor, or whose political position is more or less disturbed, possess latent elements of production, which time and circumstances will develop in a greater or lesser degree.

“Amongst the factors of the production of these there is one which was for a long time considered indispensable,

without which it was thought impossible to conduct that branch of industry with success. We refer to slavery, which was identified with plantation labor in all the old sugar colonies, the suppression of which, in the opinion of observant men in the past, would bring about a great disturbance of the colonial sugar industry, if not its absolute ruin. The example of our former colony, Hayti, from which the cultivation of the cane, formerly so prosperous, has entirely disappeared, and that of Jamaica and other English West Indian Islands, whose not less celebrated plantations have been to a large extent abandoned since the great Act of Emancipation in 1838, were certainly of a nature calculated to spread this idea, which the decay of the sugar production in Martinique and Guadeloupe after the Revolution of 1848, and the decree of abolition which ensued, has not a little contributed to strengthen. The fact is, that at the time when the political and social events to which we allude took place, slave labor played a preponderating part, and it might be said that the production of cane sugar was exclusively dependent on it. A large number of hands were required for the cultivation of the tropical plant, and the smallness of the quantity of the product obtained therefrom, in works with defective machinery and producing an inferior raw sugar, increased still further the part played by servile labor, which had then no counter-balancing factor in the powerful appliances afterwards supplied by science.

“For a long time, therefore, the word colonist was equivalent to slaveholder, and the party favoring slave labor was sufficiently rich or powerful to have in the Mother Country influential organs of public opinion, which were partisans of this institution. Things have changed considerably since that time. Slavery has been abolished, and the greater portion of the small factories, dating from the time of Pere Labat, have disappeared, whilst the last cyclone in Martinique must have made an end of the very few which still existed in that unfortunate country. Eighteen large central factories have replaced the hundreds of little estates of the olden time, the only occupation of which now is to supply the raw material for these works, which they can do under such conditions that the cane-grower can obtain a pro-

fit equal, if not superior, to that which he realised when he made his own sugar direct. By that division of labor which is a principle of the central factories, and by much improved methods of manufacture, the yield obtained from the cane has been doubled, and the part played by labor as compared with the sugar produced, has been reduced by one-half. In this manner the effect of the abolition of slavery has been successfully dealt with in our colonies, and, with a smaller quantity of cane, the production of sugar has steadily risen above its former level.

“The social position of the large island of Cuba, during the existence of slavery, and notably in the very recent period preceding the gradual abolition of that industry, has been the subject of frequent consideration from an economical point of view. It was generally admitted that the Cuban planters, deprived of slave labor, and without any practical means of replacing it by Indian, African, or Chinese immigration, would have their production diminished to a very great extent, and that a large number of plantations would be given up. Contrary to expectation, these suppositions have only been partly realised, and though labor has become scarcer and more costly, the Cuban planters have, as a compensation, found means to employ less of it, and to obtain from it better results. A number of small, badly-situated factories, and some whose working was defective, have, as a matter of fact, been demolished or abandoned, but in their place admirably arranged establishments have arisen, and at the present moment the number and magnitude of the sugar undertakings in Cuba is surprising.

“Not that the general production of this fine colony is sensibly increasing. We see by the statistics last published, that in 1891 it was about the same as in 1873, viz., 750,000 tons, against 775,000 tons, and that it fell off very little in the critical period, 1881 to 1883. But this production, till lately divided among a very large number of proprietors, has acquired an incomparable force of concentration, and central factories are constantly multiplying in all the cultivated parts of the island. Some of these are stated to be able to work up as much as one hundred million kilos of cane during the season, and Cuba can now boast of possessing the

largest sugar factories in the world. The yield obtained from the cane by the most improved mills, and especially by diffusion, has more than doubled in these works, and the economical result which we pointed out in the case of Martinique and Guadeloupe, that of a reduction in the manual labor per quantity of sugar obtained, has been realised in Cuba on a considerable scale. The scarcity and high price of manual labor are undoubtedly a constant difficulty in Cuba, as in other colonies, but this is no longer an insoluble question, and the system of central factories has rendered it possible to solve it almost completely.

“Louisiana, which up to lately possessed 1,000 to 1,200 small sugar works, which had never, at the time of the greatest prosperity of the States, been able to produce more than 230,000 tons of sugar, is entering resolutely on the same path of progress. Consequent on the war of secession, and the abolition of slavery resulting from it, negro labor became scarce and dear in the whole of the Southern States. But the economic phenomenon which appeared in our Colonies,—the initiative as regards which, we may say, was taken by France—that of a separation between agricultural and manufacturing work, in other words, the system of central factories, this phenomenon has stepped in, and will have the same results as those attained in Cuba. Fifty factories, with superior machinery, located along the great river which traverses Louisiana, or situated in the neighborhood of railways, will easily do the work of 1,000 or 1,200 small estates of the past time, and will furnish a yield of at least double that which the latter obtained with much difficulty. Slavery has left a gap which can be easily filled up, and free labor, which is that to which the Louisiana planters have since had to look, is proving its superiority every day.

“The economic facts which we have adduced are of prime importance; they mark an interesting phase in the history of the cane sugar industry, which is being regenerated by science and freedom. Much more sugar is being made with a less number of hands, and, thanks to better manufacturing plant, the product of the crops, which up to lately was partly lost through bad appliances, has more than doubled. This constitutes a philosophical triumph, and on this domain, the

applications of science are in agreement with the principles of humanity."—*Sugar Cane.*

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THE SUGAR INDUSTRY OF SANTIAGO DE CUBA.

REPORT BY CONSUL REIMER, IN LOUISIANA PLANTER.

The district embraced in the following report comprises the jurisdictions of Santiago de Cuba, Guantanamo, and Manzanillo.

This year's enormous sugar crop of the island of Cuba—827,000 tons, against 560,000 tons last year—clearly demonstrates the wonderful agricultural resources and possibilities of this island. Although this, it might be said, unprecedented increase can largely be attributed in the western end of the island to more favorable climatic influences—rains while the cane was growing and occasional showers and great heat during crop time—it must also be admitted that, slowly but surely, sugar-producing on the island of Cuba is becoming as much a science as a business. Competition has done this, and with it has produced new labor-saving inventions, which reduce the cost of the product. The most notable of these inventions is the bagasse-burner, which enables the planter to use as fuel for his boilers the wet bagasse as it comes from between the rollers of his cane mill. It is with pride that we can say that the only wet-bagasse burners so far in use and proved to be absolutely practicable are of American invention and patent.

Owing to a drought such as has not been experienced here for many years, and with many estates also the lack of capital to introduce new machinery, the crop of this consular district, with the sole exception of Manzanillo, has shown a marked decrease as compared with last year's figures (see statement herewith). This drought not only has meant a cost equal to the expense of making a full crop, but also a great loss in hauling and working cattle, and no doubt both here and in Guantanamo retards the speedy introduction of improvements in the way of machinery. With a soil so prodigal in its fertility, the sugar industry in this consular district only lacks the impetus which capital can give it to produce double and more the present crop; and, as commercial re-

lations between our country and Spain will no doubt put the planter on a more prosperous basis, the future of this business looks bright.

Owing to the introduction of foreign labor to work the mines of this consular district, which mines formerly absorbed a great deal of the laboring force available, the dearth of laborers has not been so great this year as last; but, notwithstanding this, wages have, as a general thing, not decreased from last year's prices.

The jurisdiction of Santiago contains nine sugar estates, most of which are handicapped by excessive railroad freight and large hauling expenses. One, the largest, has a bagasse-burner invented by an engineer on the estate and made in France. Two have two three-roller mills, and the others, as a rule making small crops, have old machinery with very few improvements. As a rule the machinery at present in use here is imported, as follows: Grinding mills from England and France; defecators from France and England equally; evaporating machinery (triple effects, etc.), from France and England. Lately American machines have been introduced and will find a ready sale here. The centrifugals are all of American patent (Hepworth & Weston's), although some of these are manufactured in Europe. Rum stills all come from Europe or are made locally. Engines are mostly English and French. Boilers hitherto were mostly of English and French manufacture, but now the Babcock & Wilcox boilers are being introduced; and, as it seems that this firm does not sell any of the Cook patent wet-bagasse burners except with boilers, and as the prominent estates that do not have these burners will almost be compelled to introduce them for next crop, the sale of American patented boilers will increase rapidly, especially now with the concession of the new Spanish treaty. These facts as regards machinery also apply to Manzanillo and Guantnamo. The different conditions in which each separate estate is placed—the differences of distance from the seaboard and railroads, some with very old, others with newer and new, machinery—make it most difficult to form an estimate of the cost of sugar-producing. We must in consequence take as an average an estate with improved machinery cultivating 1,000 acres of cane fields, each

acre producing 26 tons of cane and yielding from each ton of cane say 200 pounds centrifugal sugar and 13 pounds molasses sugar, not producing molasses, but rum instead. Such an estate would be a fair average in this consular district, although some in Manzanillo and Guantanamo, and even here, produce more cane and get a higher percentage of sugar.

It is well here to mention the question of fuel. Old estates that have exhausted their supply in the immediate vicinity of the sugar house have been known to pay as high as \$3 per ton for wood for fuel. Bagasse burners have done away with this expense, and, as it has been proved, pay for themselves in two crops in the saving of fuel.

Land suitable for sugar cane cultivation is worth, in this consular district, from \$12.50 to \$35 per acre, according to its distance from the seaboard and transporting facilities for the product it may produce. This value can be easily determined by calculating the average yield of cane, its cost of production and conversion into sugar, and the consequent cost of conveying such sugar to the seaboard in carts and by rail.

An estate having all modern machinery except the bagasse burners (I do not take as a model an estate with bagasse burners to show the great advantage this invention has proved to be) will grind in a fair season and under ordinary circumstances in say 100 days, 60,000 quintals of sugar, the yield of 1,000 acres of sugar cane, of which sugar an average of 90 per cent. is centrifugal, and 10 per cent. is molasses sugar—this with two three-roller mills, defecators, evaporators, centrifugals, etc.

We have now reduced this problem to the question, if 1,000 acres of cane produce 60,000 quintals of sugar at a cost which is detailed below, how much does 1 cwt. of sugar cost on the estate ready for shipment?

Having already mentioned the average cost of land, the writer estimates the cost of preparing it to yield a crop of cane within the year, canes being planted in May, June, and October, to be :

	Per Acre.
Clearing.....	\$16
Planting and weeding.....	3½
Cultivating, etc.....	10
Total.....	\$60

These expenses, especially the one of clearing new land, cannot be included in the actual cost of the crop, but must be numbered with the capital actually invested on which the planter desires to make his profit.

An estate, in order to make these 60,000 quintals in 100 days, has the following expenses, annual expenses belonging to each crop, as one crop is made per year :

Manager of estate, salary per annum.....	\$ 2,000
General foreman, salary per annum.....	1,200
Book-keeper, salary per annum.....	720
Timekeeper, salary per annum.....	600
First engineer, salary per annum.....	2,400
Cane-weigher, salary for six months.....	360
Six foremen in cane fields at say \$480 per annum.....	2,880
300 heads of cattle at an average loss of 10 per cent. (this, of course, last year, owing to the drought, has been much greater), good hauling cattle being worth about \$34 per head, say 30 heads.....	1,020
Interest on investment of cattle at 12 per cent. per annum....	1,224
Cost of cultivation of cane at the rate of \$10 per acre of cane which yields 26 tons of cane, giving, say, 180 gallons of from 8.82 to 9.09 pounds weight and 200 pounds centrifugal and 13 pounds molasses sugar.....	10,000
Interest on investment and repairs on 40 carts, worth \$102 each, 12 per cent.....	460
Cutting cane at, say, 40 cents per ton.....	12,800
Loading on carts at 20 cents per ton of cane.....	6,400
Hauling to mills (this with bulls and carts of the estate), 40 cents per ton.....	12,800

SUGAR HOUSE.

Three or four assistant engineers at \$60 to \$75 per month during crop time.....	1,000
Stokers, 5 cents per 1,000 pounds of sugar made.....	3,000
Fuel, say on average 3,000 tons at the average price of \$2.25 per ton.....	6,750
Handling bagasse, 10 cents per 100 pounds of sugar made (with bagasse burners this expense is completely done away with, and this at comparatively small cost), say \$15,000 to \$20,000.	6,000
Sugar boiler, 2½ cents per 100 pounds of sugar made.....	1,500
Under sugar makers, 16 men at \$1 per day for 100 days.....	1,600
Purging department, including centrifugals: 54,000 quintals centrifugal sugar, at 2½ cents per quintal.....	1,350
6,000 quintals molasses sugar at 4 cents per quintal.....	240
Bagging bags (holding about 300 pounds), sewing and handling on the estate, 30 cents per bag.....	6,000
Dwelling house of manager and assistant, \$200 per month....	2,400
Cost of crop at estate.....	\$84,704

As the cost of machinery is growing less every year and new inventions are constantly made, it would be impossible to give an idea of the value of sugar estates in this consular district, and consequently interest on the amount of capital invested cannot be included in the above calculation.

Referring again to the fuel question, as one ton of coal represents three tons of dry and five tons of wet fuel, and the import duty here has been taken off by our treaty, it may be profitable to import coal from the United States, especially to those estates having no bagasse-burners and which exhaust all their available fuel very rapidly.

As is seen by statement herewith, no molasses is made in this jurisdiction and Guantanamo, and very little in Manzanillo. Almost all estates have stills, in which they make rum of the refuse molasses. Owing to lack of data and statistics, it is impossible to state how much rum a certain quantity of molasses will give. An estate grinding 26,000 tons of canes and making 60,000 quintals of sugar can produce, say, from 36,000 to 40,000 gallons of rum, 32 degrees. Cartier, at a cost, say, \$1.50 per puncheon of 120 gallons, to which has to be added the cost of the empty puncheon and also interest on value of stills. Some stills are made by local coppersmiths; the more perfect ones are made in France. The production of rum is: Santiago de Cuba, about 1,500 puncheons; Guantanamo, about 2,800 puncheons; total in consular district, 3,300 puncheons. The greater part of this rum has been shipped to England and sells (costs, freight, and insurance) at 1s. 8d. per imperial proof gallon, which leaves net here about 24 cents per American gallon. In former crops this rum was consumed and sold here.

A system of cultivating cane largely in use in Manzanillo, and also introduced lately in Guantanamo and here, is the colonist system. In other words, the estate, instead of cultivating its own cane, buys it from the colonist, giving 100 pounds of centrifugal sugar for 1 ton of cane delivered at and on the conductor of the mill.

We now come to an item of much importance to the sugar planter, the cost of transportation on board the vessel. In this respect the estates in this jurisdiction of Santiago de Cuba are at a disadvantage, the most of these being distant

from the railroad and having in consequence to pay heavy carting expenses, and railroad freights are also comparatively high. It is estimated that the cost of transportation here and in Guantanamo is: Carting to railroad, per kilometer, 2 to 3 cents per 100 pounds; railroad freights, per kilometer, 1 cent per 100 pounds; storage, 5 cents per 100 pounds; lighterage, drayage, and handling, 7 cents per 100 pounds. Ocean freights have varied from 10 to 18 cents per 100 pounds to United States ports.

Guantanamo has fifteen estates, of which two are near and on the bay, thus saving the above transportation expenses.

The nine estates of Manzanillo are all situated on the coast from Cape Cruz to Manzanillo. The fact that this jurisdiction has since 1887 increased its production 100 per cent. tends to show that new estates have been established. Hence sugar, with modern machinery and all improvements, can be made much cheaper there than here and by some estates in Guantanamo. These new estates are owned by American and English capitalists, and have given the largest yield of sugar (111,000 quintals each) of any estates in this consular district.

It is stated that the present crop of sugar has been sold at the average price (costs and freight) of \$3.12½ per 100 pounds, and we can calculate that the average cost of producing sugar and putting it where it will yield the above price is :

	Per 100 pounds.
Santiago de Cuba.....	\$2.50 to \$3.25
Guantanamo.....	2.00 to 3.00
Manzanillo.....	1.75 to 2.50

These prices are for this short crop and can not be taken as an average, as under more favorable circumstances they may be reduced.

So far, owing to sufficient rains and great heat this summer, the outlook for the next crop is more favorable, and everything up to the present writing promises a very large crop.

Our new treaty with Spain, apart from sugar machinery, locomotives, and rolling stock, will cause planters to secure their steel rails, hitherto purchased in England, from the United States.

TABLE SHOWING THE SUGAR CROP IN THE CONSULAR DISTRICT OF SANTIAGO DE CUBA IN 1890-91:

PORTS.	SUGAR SHIPPED TO				
	United States.	Coast-wise.	British province.	Spain.	Sundries
	Quintals.	Quintals.	Quintals.	Quintals.	Quintals.
Santiago de Cuba.....	241,716	11,209	700	1,142	30
Guantanamo.....	415,521	73,098
Manzanillo.....	411,862	76,481	19,151
Total.....	1,069,099	160,788	700	20,293	30

PORTS.	Sugar on hand June 30.	Estimated consumption.	Total crop of 1890-91.	Total crop 1889-90.
	Quintals.	Quintals.	Quintals.	Quintals.
Santiago de Cuba...	29,203	20,000	304,000	355,700
Guantanamo.....	69,381	10,000	568,090	773,700
Manzanillo.....	29,429	30,000	566,000	495,115
Total.....	128,013	60,000	1,438,923	1,624,515

The total crop of 1890-91 was divided as follows:

DISTRICTS.	Centrifugal sugar.	Molasses.
	Quintals.	Quintals.
Santiago de Cuba.....	273,600	30,400
Guantanamo.....	511,200	56,800
Manzanillo.....	524,513	42,410

The following statement shows the quantity of molasses shipped to the United States:

	Hogsheads.
From Manzanillo.....	2,088
On hand.....	255
Total molasses crop.....	2,343

The product of rum was about as follows:

	Puncheons.
Santiago de Cuba.....	1,500
Guantanamo.....	2,800

OTTO E. REIMER, Consul.

THE BUREAU OF AMERICAN REPUBLICS.

A correspondent of the Philadelphia *Ledger* furnishes an account of the Bureau of American Republics, of which so much has been heard of late, as follows :

“In a dignified but unpretentious building, once a roomy private residence, facing Lafayette Square and nearly opposite the State Department, a sub-division of federal business has its *habitat*, under the title of the Bureau of American Republics. This agency was created by the action of the late International American Conference during its deliberations following the extended journey made by the members two years ago through the northern states, and is very properly under the management of the man who, as the representative of the State Department, carried that notable expedition of Latin-Americans through the prescribed tour with such pronounced ability and entire success.

“The objects of the Bureau of American Republics generally stated, is the collection and diffusion of information between the several southern countries represented at the conference and the United States, and also the encouragement of the study, by the people of this country generally, of the interesting republics between the Rio Grande and the Straits of Magellan.

“The bureau, there created, is sustained by all of the countries subscribing to the undertaking in proportion to their population, this nation meeting a trifle more than one-half of the annual expenditure, which is placed at \$36,000. The bureau is to be continued ten years, and thereafter indefinitely if found of practical service. The director is under the supervision of and accountable to the Secretary of State.

“Turning from lucrative journalistic work, Mr. William E. Curtis, the Director, soon formulated the scope and plan under which the labor of the agency is now conducted, and the first annual report, just issued, reveals the results of the first year of effort.

“Fortified with abundant personal knowledge of many of the countries of Central and South America and of Mexico, Mr. Curtis projected and published a series of bulletins, each containing a vast amount of general and statistical matter,

not only very interesting, especially when accompanied by illustrations and maps, to the intelligent general reader, but of decided service to all of the numerous manufacturers who would gladly push their goods in those countries, and to marine interests contemplating the enlargement of intercommunication with them by sea. Inquiries by the thousand poured in upon the bureau soon after the nature of its work became known, from business men, shippers and investors, all of which were promptly answered by means of these bulletins or by letter, uncertain points being determined by requests for information from the countries involved.

“Twenty-eight bulletins have thus far been issued. They include hand-books, works upon patent and trade-mark laws of various countries, upon their import duties, money, weights and measures, present foreign commerce, etc., while nine are in the shape of commercial directories.

“The following page from the annual report expresses fairly some of the results of the stimulated interest in this country toward the Latin-Americans, and, as well, the attention the United States is already enjoying among Latin-Americans as a result of the conference and the intelligent efforts of its bureau.

“It is gratifying to know that interest is increasing, and that the information communicated by this bureau has already been the means of extending, to a certain degree, commercial and social intercourse between the United States and the Latin-American nations. This fact is demonstrated not only by the rapid growth of exports, but also by the long passenger lists of steamers plying between this country and Central and South America, and by the enormous increase in weight of mails. Many manufacturers of the United States who have never attempted to sell merchandise in the southern continent are now sending agents into those markets to introduce their goods, to make the acquaintance of importing merchants, and to establish permanent agencies and systems of credit. Three new lines of steamships have been established between the United States and the ports of the southern republics, and the existing companies have been compelled to increase the number and size of the vessels they have had engaged in the trade, and to make more fre-

quent voyages to meet the demand for freight and passenger accommodation.

“The merchants of Mexico and the cities of Central and South America, who have heretofore purchased their goods in Europe exclusively, are now coming to the United States, and invariably discover that they can find here nearly every article they need, of a better quality and a price as low as can be obtained in Great Britain, Germany and France; and the recently negotiated reciprocity arrangements afford them advantages that are beginning to be understood and appreciated. Not long ago the agent of one of the largest establishments in Brazil, which is operating upon European capital, and has heretofore obtained its supplies entirely in Great Britain, visited the United States on his way to purchase goods in Europe. He found that he could do better here, both in quality and in price, and went no further. His purchases, which amounted to several hundred thousand dollars' worth of manufactured merchandise, are now being shipped from New York.’

“Within the past twelve months letter mails have increased between our ports and those of the West Indies, South and Central America 25 per cent., and the printed matter mailed has increased in nearly the same proportion, the increase for all mails with the Central American states being over 50 per cent. Newspaper readers have doubtless observed the frequency of news items of a commercial nature which have appeared in the press of the United States this year as the result of systematic diffusion of information sent to this bureau. Political rumors and happenings affecting the southern countries have not found publicity through this channel.

“The principal newspapers and periodicals of the Spanish and Portuguese speaking countries of this hemisphere are filed for the convenience of the diplomatic corps and others who may wish to consult them.

“In addition to the somewhat arduous labor involved by the duties suggested in the foregoing, Mr. Curtis has found time to lend his abilities as an organizer to the authorities of the Columbian Exposition. The plan of the Latin-American scheme of exhibits, which will be very largely historical, was

built upon the suggestions of the Director of the Bureau of American Republics, and promises to form one of the salient and memorable features of that great event. The complete nature and extent of the exhibit of Columbiana, gathered by this bureau, including original documents, fac-similes, prints, photographs and implements, will be a surprise to the public.

“Army and navy officers are now engaged both in Latin-America and Spain in the collection of educational matter for this department, for which purpose a special appropriation was made by Congress.

“An officer of the navy, detailed for that purpose, is now in Spain superintending the construction of a caravel, which is to be an exact fac-simile of that in which Columbus made his first voyage of discovery. It is to be equipped in the same way and manned by Spanish sailors in the costume of 400 years ago. This vessel will be completed and brought to the United States in time to participate in the naval review that is to take place at New York in April, 1893, and will be towed through the lakes to Chicago, to remain during the Exposition. It will then return to Washington and be permanently moored in the river south of the executive mansion.

“It is also proposed to build at the Exposition a duplicate of the Convent of Ribida, in Spain, wherein the discoverer found refuge at one period of his career.

“The commercial display already assured from the South and Central American Governments through the bureau, will be in every way worthy of the efforts being made to bring it together.”

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THE SUGAR BUSINESS.

The proposal of the American Sugar Refining Company to increase its capital stock has excited much interest, particularly among the holders of the stock, and sharp fluctuations have already resulted. The large holders somewhat obtrusively declare their indifference whether the stock drops or not in market price, and if their last annual report is in all respects reliable, they may well be contented to hold a property that earns 10 per cent., and pays 8, even if it does behave erratically in the market. There remains the ques-

tion, however, whether the company may be able to earn as much in another year, and whether the proposed increase of stock can be made of such use that the earnings on the entire stock can be maintained at the rate of last year.

The annual report showed the net earnings of \$5,073,002 on the capital stock, or a trifle over 10 per cent., but it is quite possible that a captious expert might find some ground for doubt in the vagueness of some important items of the statement. "Outstanding accounts, \$2,971,642; stocks and investments, \$3,558,288, and other items \$2,842,847," form a tolerable large part of the reported assets, and if in either of these items there should happen to be the kind of valuations or mistaken accountings which are exceedingly apt to occur in such items the concern might not have realized in fact the full amount reported as net earnings for the last year. According to *The Sugar Trade Journal*, the quantity of sugar melted by the American Company during the year was 1,180,990 tons, which would make the average net profit on refining .192 of a cent per pound. But there are not a few critics who question whether the real net profits, after deducting all properly chargeable expenses and losses for the last year, have amounted to so much.

A more disquieting fact is that the other independent refineries, not embraced in the American Sugar Company, appear to have increased their proportion of the whole business of the country, while the proportion secured by the American Sugar Company has diminished. The journal above quoted has given the following figures as showing the quantity of sugar refined in 1891 and in 1890: By the American Refining Company, 1,180,990 tons in 1891, against 974,937 tons in 1890; by all other refineries, 630,004 in 1891, against 464,794 tons in 1890. The total quantity melted would therefore be 1,810,994 tons in 1891, against 1,439,731 tons in 1890, and the proportion of all meltings by the American Sugar Company was 65.21 per cent. of the whole in 1891, against 67.7 per cent. in 1890, but by other refineries 34.79 per cent. in 1891, against 32.3 per cent. in 1890. The increase in quantity refined by the American Company was 206,053 tons, or 21.13 per cent., while the increase in quantity by the outside refineries was 165,210 tons, or 35.5 per cent.

If these figures are approximately correct, they indicate that the competing independent companies gained quite perceptibly upon their great antagonist in 1891, and it would not take many years of such success to give them an advantage so decisive that the American Sugar Company could no longer rely upon the net profits of last year. But there is another fact which must not be forgotten, for it is highly important in this connection. The removal of sugar duties last year gave an extraordinary stimulus to the demand and consumption, particularly for the packing of fruits. Enormous stocks of preserves and canned fruits were prepared, possibly in excess of immediate consumption. It is not at all certain that the consumption in this country will be as large this year or next as it was in 1891, and if the American Sugar Company is compelled to get its profits on a constantly diminished proportion of a much reduced total melting, its net profits may shrink materially.

Hence it is asserted that the purpose of the increase of capital stock is to absorb some of the competing companies. But there is no certainty that this can be accomplished. The outside concerns are making profits which, judging from their rapid increase in output of sugar, ought to be highly satisfactory, and they can get along very comfortably if the American Company finds itself compelled, for the sake of its stockholders and their dividends, to keep up the price of sugar so that the outside refineries can realize good profits. In that event the outside refiners may well question whether they would be able to earn more money on their capital, if absorbed by the combination, and with it exposed to steadily growing competition from independent refiners, than if holding their present position. If all the concerns in the country were vitually consolidated and managed as one company, the profits might be large for a time, but it is quite within the limits of possibility that the present duties on refined sugar might then be taken off somewhat suddenly, so that the refiners' monopoly would be compelled to compete on equal terms with the refiners of other countries. In that event, it is scarcely necessary to say, the net profits realized last year would hardly be maintained, particularly if the capital stock of the company should be increased one-half.—*N. Y. Bulletin.*

VALUABLE BUGS.—INTRODUCING FOREIGN PEST DESTROYERS.

PROFESSOR KOEBELE HAS FOUND BEETLES THAT WILL PREY ON ALL SCALES.

Secretary Lelong and Quarantine Officer Craw of the State Board of Horticulture were in ecstasies Saturday. All the afternoon they bent over a mysterious looking set of boxes and talked learnedly of bugs. There were bugs in boxes, bugs on the tables, bugs on chairs, bugs in the air and bugs everywhere about the place. In all there were about 6,000 beetles, and of that number between 200 and 300 were alive. "Those insects," said Mr. Lelong, "I confidently believe will be worth over \$20,000,000 to the State.

When the Australian ship Monowai arrived on Christmas she had on board the consignment of little insects that are expected to do so much good to the State. They had made the trip in the ice chest to keep them dormant, Mr. Lelong explained. They were immediately taken to the State Board of Horticulture and were sent off, after careful examination, to be colonized in Los Angeles. They were sent here by Professor Albert Koebele, who went to Australia, New Zealand and adjacent countries as the accredited agent of the Department of Agriculture and of the State Board of Trade to search for predaceous and parasitic insects. Professor Koebele discovered the vidalia about three years ago, and their introduction into the orchards of the State has meant a profit of countless millions. With his present shipment he sends a positive assurance that the beetles will be found all that is necessary to destroy the dangerous insects of the State. If he be correct in his estimation of their value, then the bugs that came upon the Monowai will represent by far the most important event in the horticultural history of California. He considers them more valuable even than the vidalia.

There are representatives of thirty species of beetles sent in the last lot. They are all new to the State, and little is known of their habits other than the brief statement of their usefulness written by Professor Koebele. They are fatal to the pests of all citrus and deciduous fruits, apples, prunes,

pears, peaches, oranges, and in fact almost every fruit that grows in the State. One of the greatest problems in the mission of Professor Koebele was the discovery of some destroyer of the red scale. He thinks that among the insects which the officers of the Board of Horticulture inspected so enthusiastically yesterday will be found the desired destroyer. So confident is he in his opinion that he declares he will not return to the United States until the arrivals prove to be all that he has claimed for them.

Late yesterday afternoon the boxes were carefully repacked and forwarded to Professor D. W. Coquillett, the special agent of the Agricultural Department at Los Angeles. He will endeavor to colonize the insects preparatory to their distribution among the orchards. Tents will be put over the trees on which they are to be placed. As soon as they show signs of activity and life they will be placed free in the orchards of the county.

The State Legislature at its last session appropriated \$5,000 for the investigations now in progress. That the investment will save millions of dollars there can be no doubt. Professor Koebele is now in New Zealand. His investigations take him to many islands in the South Seas and before he returns he may go to South Africa. He will be kept at work as long as the appropriation will permit. It is expected that he will be away at least two years.

A short while ago he sent 2,000 bugs similar to those received on Christmas. Out of that number only twenty-eight lived, but they multiply with marvelous rapidity. Neither lot will show much result until warmer weather sets in. Then the value of the bugs will be definitely known.

Secretary Lelong gave a detailed account of the insects yesterday, with a detailed statement of their particular usefulness. "The readers of the *Chronicle*," he said, "will remember that only a month ago we gave a full account of predaceous insects received from Professor Albert Koebele. In the consignment received yesterday thirty species are represented, and in a letter to me Professor Koebele says that he has been very successful in his researches and has, he is sure, discovered the insects that destroy the red, black and brown scales which have caused the fruit-growers no little

uneasiness and have been a great menace to the successful production of several kinds of fruit.

"It is only about three years ago that the *vidalia cardinalis*, the insect that exterminated the cottony cushion scale, was introduced. It gave citrus culture an impetus extraordinary in its character, for the production of citrus fruits this year in California was the largest ever known in the State. It was all due to the wonderful insect the *vidalia*. It is hoped that the insects now being introduced will prove equally as beneficial in eradicating the many orchard pests that trouble the different fruit.

"The following is a list of those received on Christmas day: *Chayptoloema*, feeding on mealy bugs from Toomomba; *coccinelledæ*, feeding on the red scale from Paramatta; *coccinellidæ*, new species of *vidalia*, feeding on the red scale at Paramatta; *coccinella*, feeding on *lecanimus* and mealy bugs at Toomomba; *scymnids*, feeding on red scale at Sydney; *coccinellidæ*, feeding on wooly aphis at Toomomba; *coccinellidæ*, feeding on coccids at Brisbane; *coccinellidæ*, feeding upon red and white scales at Toomomba; *coccinellidæ*, feeding upon aphis; *coccinellidæ*, feeding chiefly upon the red scale; *orcus calyleeus*, feeding upon the red scale at Paramatta; *coccinellidæ*, feeding chiefly upon *chryptocma*; *orcus scymnid*, feeding on red scale at Paramatta; *coccinellids*, preying on cabbage aphis; *scymnids*, preying on *lecanimus* and mealy bugs from Toomomba; *orcus calyleeus* and *orcus Australasia*, feeding upon red scale at Paramatta; *talpochares cocciphagu*, preying on black and brown scales at Paramatta; *thalpochares* and *eriococcus paramatta*, feeding on *lecanimus*."

The result of the introduction of the *vidalia*, the most important of Professor Koebele's discoveries, has been extraordinary, as may be seen from the statistics regarding the shipment of oranges from the southern counties of the State. The cottony scale has not yet made its appearance in San Bernardino county. In 1890 there were shipped from that county 1,705 carloads of oranges. This year there were 1,708, a gain of only three carloads. The figures may represent the natural output of the county. The cottony scale had made, however, an extensive home in the Los Angeles county. In

1890 the shipment of oranges was 781 carloads. Then the vidalia was introduced, and this year the shipment was 2,212 carloads, a marvelous gain, due only to the pest-destroying insect.—*S. F. Chronicle, Nov. 30, 1891.*

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THE SUGAR MONOPOLY.

The American Sugar Refining Company has completed the first year of its existence and has made a report to stockholders, which, for fullness and clearness, is equal to any reports published by manufacturing corporations. It was on or about January 1, 1891, that the old Sugar Trust expired and was succeeded by the above named corporation. The trust was about as obnoxious to investment stockholders as it was to the public. During its existence no report was published of assets or liabilities or of earnings. A privileged few had a monopoly of all knowledge of the affairs of the concern.

Certainly stockholders have gained from the conversion to a legally organized corporation quite as much as has the public. Indeed, it is difficult to see how the public has made any tangible gain. The "trust" idea has been smashed. Instead of a vague and ever-vanishing organization, which the law could not reach save to destroy, there is now a very substantial corporate body, recognizing its obligations under the law, domiciled where it can be discovered on occasion, and easily subject to legislative regulation and restraint. But, after all, the essential idea of the trust, was one of monopoly, and the new corporation has not abandoned that in the least degree. It has never had a complete monopoly of the business of refining sugar, nor did the trust ever attain such monopoly. Nor is it any more difficult now to carry forward the work of monopoly than it was during the era of the trust. Combinations to regulate output and steady prices, and, as well, combinations equivalent to consolidations, are as easy of accomplishment now as ever they were.

The American Sugar Refining Company has had a good year. Stimulated by the lower price of sugar, consumption in this country increased in 1891 some 23 per cent. over that of 1890. Consumption per capita has now risen to some 67

pounds, while that of Great Britain is only about 74 pounds. Such rapid growth is abnormal, and cannot be expected to continue at such a rate. A small further increase in 1892, of say some 5 per cent., will be very satisfactory indeed. It goes without saying that in a year of such great increase in consumption, profits should be good. They were indeed. This company earned 7 per cent. on its preferred stock, and over 12 per cent. on the common.

Yet there are perils connected with the business. The margin of profit is very small, when the total volume of business is considered. Probably the American Company averaged through the late year less than $\frac{1}{2}$ cent per pound profit. It will be observed that had the average profit been reduced even very slightly, there would not have been earned a full 8 per cent. on the common stock. Possibly the current year, with a slower growth of consumption, may be a period of smaller profits. Whether it is or not, the average profit obtained is so small that the necessity of avoiding competition and cutting of prices is apparent to all.

This thought brings us to the fact that the American Sugar Refining Company, with its large capital, has never yet attained a complete monopoly of the business. That there is no security for heavily capitalized concerns, except by monopoly, goes without saying. The sugar magnates evidently realize this fact. They have been laboring to perfect their monopoly, and with some success. Their preparations have reached the stage where it has been found necessary and timely to arrange the means for carrying out their plans. Accordingly they have asked for and obtained authority to increase the capital stock from \$50,000,000 to \$75,000,000, one-half of the increase to be preferred and one-half common. That this proposition was brought forward is good evidence that plans have been made to take in the outside refiners, and that there is a necessity for doing so.

The American Sugar Refining Company is only following in the footsteps of the National Lead and National Cordage Companies. Both of those concerns have found it essential to have a virtual monopoly of their respective industries, and now the sugar business is to be monopolized. We fancy that without monopoly the large capital of the American Com-

pany would have small assurance of continued and regular dividends at the present high rate.—*United States Investor.*

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THE SUGAR REFINING INDUSTRY.

This is divided into two camps, that of the American Sugar Refining Company and seven outside refineries, some of which we are confident, have an understanding with the American Sugar Refining Company.

In 1880 there were forty refineries in the United States reported to the United Census Bureau as having a capital of \$25,987,500. At the port of New York there were twenty refineries with a capital, in 1880, of \$16,176,000. There were twenty corporations transferred to the American Sugar Refining Company, having a daily capacity of 34,000 barrels. One of these was burned, four were dismantled. Improvements and additions were made which kept the capacity up to 34,000 barrels per day, practically the output of ten refineries.

The outside refineries comprise the Franklin Sugar Refining Co., E. C. Knight & Co. Sugar Refining Co., Spreckles Sugar Refining Co., Delaware Sugar House, all of Philadelphia, and having a daily capacity of 11,300 barrels, the first leading with 6000 barrels. Then there is the Revere Sugar House in Boston; the California Sugar Refinery, San Francisco, and the Baltimore Sugar Refining Co., at Baltimore, the last three named having a capacity of 4100 barrels daily, thus giving the outside refineries a total capacity of 15,400 barrels per day, or little less than one-half the capacity of the American Sugar Refining Co.—*American Grocer.*

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THE YEAR 1891.

Full detailed statements for 1891 are given in the "Statistical," with comparisons for ten years. In 1891 the receipts of sugar were at New York, 824,081 tons; Boston, 193,661 tons; Philadelphia, 491,336 tons; Baltimore, 25,849 tons; a total of 1,534,987 tons at the four ports. Receipts of foreign sugar at New Orleans, 88,928 tons; San Francisco, 136,534 tons. No sugar was received into the United States through

any other ports. Total receipts of foreign sugar in 1891 were 1,760,449 tons, against 1,338,047 tons in 1890. The domestic crop of Louisiana is estimated at 180,000 tons, against 220,000 tons last year. The crops of Florida and Texas at 7,000 tons. The beet root sugar production in the United States in 1891 was 5,400 tons, and of sorghum sugar 570 tons, and of maple sugar 22,000 tons, and of molasses sugar 31,320 tons. The total production of the United States is 246,290 tons against 280,000 tons last season. The total consumption of sugar in the United States in 1891 was 1,885,994 tons (say 1,619,704 tons foreign, 234,970 tons domestic, 31,320 tons home manufacture from foreign molasses), against 1,522,731 tons in 1890 (say 1,257,292 tons foreign, 212,000 tons domestic, 53,439 tons home manufacture from foreign molasses). The increased consumption of 1891 over 1890 was 363,263 tons, or 23.86 per cent., and the consumption for each individual (per capita) 67.46 pounds, against 54.56 pounds in 1890. The importation of refined sugar in 1891 was 2,772 tons at New York, 1,227 tons at Philadelphia, and 1,925 tons at New Orleans, and 833 tons at San Francisco. The export of raw and refined sugar in 1891 was 29,837 tons from the four ports, and 4,693 tons from San Francisco, and 212 tons from New Orleans. The extra increase of 18 per cent. in consumption above the usual average yearly increase of 5 per cent. is due directly to the free sugar tariff, and the extreme low range of prices ruling during the entire year, with small fluctuations. We do not look for an increase in 1892 much if any above the nominal rate of 5 per cent., especially as the range of prices in 1892 will be on a higher level than in 1891.—*Willett and Gray's Circular.*

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The farmers who make the best success in farming are those who make the best use of manures and other fertilizers.

Test your fields and see what fertilizers they need. It is useless to put on fertilizers not needed.

Raising a good crop is no sign of a good farmer until you have figured out where the cost line is located.