

THE HAWAIIAN

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PLANTERS' LABOR AND SUPPLY COMPANY  
OF THE HAWAIIAN ISLANDS.

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THE latest advices from New York quote Cuban centrifugals, 96 deg test at  $3\frac{3}{4}$  offered and  $3\frac{1}{2}$  cts. asked.

THE history of England, the recent events in Hawaii, the victory of Japan and the stubborn struggle of Cuba, says an American exchange, combine to show that when an island is inoculated with the spirit of progress it is pretty sure to take.

THE annual meeting of the Planters' Labor and Supply Company will be held in this city on Monday, November 25. It is hoped that there will be a full representation from every district on the islands. Those who are expected or desire to prepare reports will bear the date in mind.

ONE of the "swellest" officers in the American navy informs the *California Fruit Grower* that half of a lemon rubbed over the surface of tan shoes will put a "shine" on them not excelled by the best efforts of the artists at the most recherche stands in the city.

THE Editor of the *Cape Agricultural Journal* answers the question—"Which is the most effective way of destroying

ants in a garden?" as follows: Arsenic and sugar is a most effective poison for getting rid of ants. The sugar and arsenic must be finely pounded and then moistened and laid about in small quantities where the ants are.

GRAPE growers are sometimes at a loss to know why their vines do not bear. The trouble may generally be traced to insects or disease of some kind around the roots. Air-slacked lime or ashes spread freely under the vine arbor and around the roots are among the best remedies known to keep the vines in a healthy condition and to prevent rust and rot.

THE decision of Commissioner Bowler at Washington, that the appropriation made by Congress to settle the bounty claims for sugar manufactured under the McKinley Act was unconstitutional and therefore illegal, and for this reason should not be paid, has not surprised any one. The case will be appealed to the higher courts, and it is probable that no final decision can be reached for some months to come.

THE AMERICAN GOVERNMENT DEFICIT.—The corrected official statement of Government receipts and expenses for the last fiscal year, places the total receipts at \$313,390,075.11, derived from these sources: Customs, \$152,158,615; internal revenue, \$143,421,672; sales of public lands, \$1,103,347; miscellaneous, \$16,706,438. Expenditures are stated at \$356,195,298, of which \$141,395,228 were for pensions. The exact deficit for 1895 is stated at \$43,941,589.61.

THE Boston *Herald* calls the idea of Mexico's annexing Cuba "eccentric," and thinks Mexico has all it can do just now to hold itself together within its present boundaries. Besides, if anybody is going to have Cuba, the United States wants it as "a field for American enterprise." We can tell better how that appears when the chance of annexation is offered. Meantime let us hope that the Cuban insurgents will win independence. No friend of liberty can wish otherwise.

THE value of the American crop of tobacco for 1894 was \$27,760,739, while that of 1881 was worth \$43,372,336,

about which sum was obtained for the crop of 1888, which yielded 565,795,000 pounds, or 115,914,986 pounds more than the crop of 1881. The imports of foreign tobacco for the same year amounted to \$12,158,175. The internal revenue receipts from tobacco for 1894 amounted to \$42,286,805, or about one-fifth of the entire internal revenue receipts of the government for that year.

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**BET SUGARS.**—American appraisers have heretofore been inclined to base the duty on raw and refined beet sugar on the value at the factory from which it was shipped. They have now adopted the rule of appraising German and Austrian sugars at the value in Hamburg, where there is a fixed value every day, that being the principal market and shipping point for beet sugars, whereas it is difficult, if not impossible, to ascertain a market value every day at each of the many factories.

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CONSULAR reports represent that the sugar industry in Java for the year 1894 was in a very bad state, owing to the low prices at which the crop had to be disposed of. Some planters stored their crops, and those who could hold them over till 1895 have done better than others who were forced to sell in 1894. Speculators from America have bought largely this year, owing to the anticipated shortage in Europe and in Cuba's next crop. This combined shortage will amount, it is thought, to over one million tons, as compared with 1894.

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The plan is now proposed in Washington to transfer the entire United States consular service from the department of state to that of the treasury. This change, it is thought, will enable the treasury department to so perfect its knowledge of foreign markets and the values of foreign goods that undervaluation of imports will be impossible. At present it is next to impossible to prevent frauds in the importation of foreign merchandise. Of course such a radical change as this will require the sanction of Congress, and this will readily be given.

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GLOBE trotters find in Japan a variety of curios made from a high grade of ivory so-called, and which sell at hand-

some figures as among the curiosities of the country. But the wily Jap gets his supply of "ivory" for that purpose from the United States in the form of shin bones of beef cattle. The steamer *Stretthevis*, sailing from Tacoma on the 18th of this month, took out about a ton of beef bones to be transformed by the ingenious "Englishmen of the Pacific" into ivory curios for admiring travelers. A considerable trade has sprung up in this connection, and may serve as an object lesson to Americans to be less wasteful in all their industries.—*California Fruit Grower*.

WHERE cholera is bred. It is to be hoped for the good of the Orient and of countries in intimate communication with it, that Japan will take measures to remove the causes of cholera which exist in the customs of its people and in the drainage of its great cities. Where men and women drink unfiltered water from wells that get the seepage from land which, for centuries has been subject to a revolting form of enrichment; where they make a meal of cucumbers and stale raw fish, and wash it down with either poisonous water or sake, and do this while the blood is heated from labor in the field, there can be little immunity from such epidemics as that which is now sweeping away thousands of victims from the face of the Mikado's realm.—*S. F. Bulletin*.

LIBERIAN COFFEE IN CALIFORNIA.—The steamer *Australia* on her last trip, says the *Chronicle*, brought from the Hawaiian Islands a number of Liberian coffee plants consigned to Dr. R. Lorini of 1208 Sutter street. Quarantine Officer Crow is now disinfecting them. Dr. Lorini intends planting them as an experiment, and thinks there are enough tropical places in the State where favorable conditions for its growth can be found. "Liberian coffee," said Mr. Crow, "is comparatively new, having been found on the Liberian coast in 1875. The flowers are white and sweet scented. The leaves are similar in outline to, but very much larger than the Arabian. The plant altogether is more robust and can be grown in localities in which the older Arabian coffee would not thrive. I have no doubt suitable climatic conditions for its growth can be had in this State."

MODESTY AND THE TELEPHONE.—They had a new girl. She was not the imported article, but was nativistic enough to satisfy a member of the A. P. A. She came from somewhere in Indiana and had never seen a telephone. She was given a hasty lesson in its use and was told to answer it when members of the family were absent. The second afternoon everybody was out but the Indiana girl. She was in her room.

An hour before dinner the female head of the family returned.

"That thing in the closet was ringing for about ten minutes this afternoon, ma'm," said the new girl.

"Why did you not answer it as I told you to do, Mary," said the mistress.

"I would have, ma'm," said Mary, "only I was half undressed, and I was afraid it might be a man."—*Chicago Tribune*.

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A LEPER ASYLUM.—Brisbane, the capital of the Colony of Queensland, Australia, is provided with a leper asylum. It is located on Peel Island, the quarantine station being near by on Stradbroke Island. They have at present only about twelve lepers, who are housed in one large and spacious building surrounded with broad verandas, and one small room is allotted to each leper, who has the privilege of the premises, but cannot leave the island. The asylum is in charge of a Superintendent, who resides on the island, and a physician visits it as often as is necessary. Suspects are at first kept at the quarantine station, and when the case proves to be leprosy, he or she is removed to Peel Island asylum. It is gratifying to know that the progressive Scotch colony of Queensland is taking the only humane course to deal with this loathsome disease, and providing a home for such incurables as are found there. A Catholic priest visits the asylum on stated occasions, with the devotion to outcasts for which that priesthood is noted. We gather the above facts from the *Mackay Standard*.

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DARK SUGARS.—The shipment of dark sugars, to the American Sugar Refining Company in New York, have continued during the year, eight vessels having loaded at this port, in-

cluding the S. P. Hitchcock, which is still taking aboard cargo, and will leave in a few days. The following table for which we are indebted to Messrs. W. G. Irwin & Co., show the ships that have loaded and sailed "round the horn" during 1895 up to date.

<i>Date.</i>	<i>Vessel.</i>	<i>Bags.</i>	<i>Pounds.</i>	<i>Tons.</i>
March 5	Kenilworth	63,912	7,997,522	3,998
March 25	Charmer	47,019	5,836,463	2,918
April 9	Oakes	54,231	6,740,730	3,370
May 23	Troop	40,963	5,008,950	2,504
June 18	Helen Brewer	45,388	5,597,056	2,798
June 25	Tillie E. Starbuck	52,207	6,372,134	3,186
June 29	Manuel Llaguna	44,065	5,461,671	2,730
In port	S.P.Hitchcock(est)	56,000	7,000,000	3,500
		403,785	50,014,526	25,004

One more vessel will probably fill up for New York before the close of this year. What the plans of the Refining Company are as to next year's crop, we have not been able to learn.

THE banana trade of the United States has assumed gigantic proportions, and is to-day the leading feature, so far as receipts are concerned, in the fruit trade. Taking into consideration the fact that in the neighborhood of sixty vessels are engaged in carrying this fruit to the different distributing markets, and that from fifty to one hundred men are employed in unloading cargoes as they arrive, it is safe to place this branch of the fruit trade in the front rank. The banana industry has seen many changes, not only in the shifting of points of import, but also in the methods of distribution. Within three years Mobile has taken third place in the number of bunches received. In 1891 and 1892 but about 150,000 bunches were received there, while in the first six months of 1895 she has handled 1,447,208 bunches. The significant change is in New York's receipts. Up to 1890 she held first place, and in 1891 New Orleans forged ahead, beating New York by about 200,000 bunches; until now, the first half of 1895, shows New Orleans to be ahead of New York's receipts 835,281 bunches.—*Fruit Trade Journal*.

THE national irrigation congress of the United States was to have been held in September, at Albuquerque, New Mexi-

co. Two years ago it was held at Los Angeles, and reference was then made to its proceedings in this journal. The congress brings together some of the ablest men in the country, the object being to discuss the best methods of utilizing the waste waters of the large streams which flow from the Rocky Mountain regions through the arid wastes of America, thereby reclaiming them and attracting thither large populations. Among the delegates from Southern California we notice the names of Wm. H. Bailey, formerly of Wailuku, H. P. Wood, formerly of Kohola, and now Hawaiian consul at San Diego, and Col. J. D. Schuyler of Los Angeles, whom many of our readers will remember as having visited Honolulu about five years ago in the interest of the Oahu Railway & Land Company. Mr. C. C. Harris, formerly of Tennessee but now of Fresno, California, will represent the San Joaquin Valley section in the congress. He was formerly an officer in the Confederate army under General Forrest. The *Rural Californian*, from which we gather this information, gives the portraits of a number of the delegates, including Col. Schuyler and Mr. Bailey.

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*EXTRACTS FROM WILLIAMS, DIMOND & CO'S  
MARKET REPORT, SEPT. 23.*

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Our latest telegraphic advices from New York of to-day are most encouraging, and as follows: Centrifugal sugar 96 test ex ship, wharf or store  $3\frac{3}{4}$ c. per lb offered and  $3\frac{1}{2}$ c. per lb asked. Little sugar offering. The advance is caused by prospects of short supplies for next campaign. Higher prices are confidently anticipated. Refined advanced to 4.44 less the usual discounts. Reports of the European beet crop are unfavorable and the crop deficiency under last year is estimated at 700,000 to 1,000,000 tons. Cuba crop estimates are being lowered and the crop suffering from drought. Trust certificates common 109, preferred  $100\frac{1}{2}$ .

RICE, HAWAIIAN—Market is dull with forced sales. There have been sales 400 bags @ 3.75 net, 700 bags @  $3\frac{7}{8}$  60 days, and 1200 bags @ 3.90. These sales, with varying prices are all by different importers and show the condition of local market. Present holdings are held at 4c. 60 days. The great

trouble is the Louisiana crop, which is very large and samples are daily arriving and always with lower prices.

KONA COFFEE—None in first hands. Price unchanged.

BRAN—Fine 11.50, coarse 12.50 per ton f. o. b.

MIDDINGS—Ordinary 16.50, choice 18.00 per ton f. o. b.

BARLEY—No. 1. feed 60c. per ctl. f. o. b. Grd. or rolled 13.00 per ton f. o. b.

OATS—Fair 75 @ 77½c. per ctl. f. o. b. Choice 95 @ 97½c. per ctl. f. o. b.

WHEAT—Chicken 90c. @ 95c. Milling \$1 @ \$1.02½ per ctl. f. o. b.

CORN—Small yellow 1.22½ per ctl. f. o. b.

HAY—Wheat comp. 9.50 @ 10.50. Large bales 10.50 @ 11.50 per ton f. o. b. Oat comp. 9.00. Large bales 10.00 per ton f. o. b.

LIME—1.00 @ 1.05 per bbl. f. o. b.

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### A PLEA FOR CO-OPERATION.

EDITOR PLANTERS' MONTHLY.—I noticed the report of the Commission on co-operation and profit-sharing in the sugar cane industry, and as I have had some experience in these matters, and my experience has led me to believe that where co-operation or profit-sharing is practicable, there is nothing in the world equal to it in spurring men to labor, and as an incentive to further trials, I desire to say a few words on the subject.

In consequence of the large capital involved there may be more difficulties to contend with in co-operation, but there is no question, but that it would be to the interest of all parties if the workmen were but slightly interested in the company for which they are working. Of course men in responsible positions, consider it their duty to exert themselves to their utmost ability and to use their best endeavors to promote the prosperity of the company or individuals by whom they are employed, in every possible way that they can think of. But this can hardly be expected of the laborers, who too often think that they are underpaid, and in consequence too often found determined to work as little and give as much trouble as they can.

Now it is for the interest of all parties that a better feeling should exist between employer and employee. And it is in this profit-sharing and co-operative business that I believe the remedy is to be found. We must remember that it is

not only in the minds of the rich that nature has implanted a desire for gain, but there is also to be found in the heart of every human creature a desire to better his condition. A man is always willing to make greater exertions, no matter how humble his condition may be, provided he can see any possibility of recompense.

I have always found that the amount of work these men will accomplish when but slight inducements are offered them is something astonishing. Besides every one must know what a vast difference there is between those men that are willing and earnest, and those that are careless and unwilling. The great object, therefore, should be to enlist their interest in the welfare of their employers by teaching them that the interest of the one has become by mutual benefit, the interest of both. When this is accomplished there will be no more labor troubles, nor will it require anything like the quantity of men now employed. This desirable state of things could be brought about, I believe, without loss to the employers, for should they but make known to their employees that they intended to divide their profits with them, even though they gave them but five per cent., they would find such a change in their work as would astonish them. I have seen this tried, and know that there is nothing that gives such an incentive to zeal and to greater exertion, as the possibility of gaining a little extra money. In such cases the men should be paid the regular wages, and five per cent. of the profit also, which they would earn twice over. If such a system were adopted there would be less trouble with the men, more work done, and a better feeling existing between employer and the employee. There would also be less likelihood of the men leaving just at the time when they are most wanted.

It may be said that there are but few plantations that are making any profits, and therefore it would be useless to offer to share them with the employees. But this is no objection, on the contrary it is for this reason that it should be tried; because if the men were fully persuaded that their wages depended largely upon their own exertions there would be such a vast difference in the amount of work done by them, that it would, I feel persuaded, require but three-fourths of

of the number of men employed to do the same amount of work. Thus a saving would be effected of twenty-five per cent. with an outlay of five per cent. This may be too favorable a view of the matter, but I fully believe the scheme is well worth trying, and that it would prove to be to the mutual benefit of both parties.

Hawaii, October, 1895.

CO-OPERATION.

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### THE ARROWING OF CANE IN JAVA.

REGAL, Java, July 16th, 1895.

EDITOR "PLANTERS' MONTHLY," HONOLULU: DEAR SIR.—Mr. Sutton of Manchester, editor of the *Sugar Cane*, had the kindness to call my attention to an article in your periodical in which you refer to an article of mine on the arrowing of the cane and its influence on the saccharine content and yield. At the end you express your desire to hear the views of any who have made observations on it, and as I live in a country where the cane always reaches its ripening point before being ground, I can purvey you and your readers with every information.

In Java the cane is planted every year afresh, only very little stubble (ratoon) is kept, perhaps no more than one-half per cent. of the whole cultivated area. The planting time begins just after the end of the wet monsoon in June and lasts till August or September. In March, even sometimes in February and in 1894 already in January, the cane begins to arrow which is continued during April, but in May most of the arrows have lost their fine, tiny flowers and the thin dry ascis only remains. The percentage of stalks that arrow varies considerably in the various fields and in different years. It is by no means to be supposed that every mature stalk arrows, and even fields where the flowering is very considerable and give the aspect as if the whole of the canes were growing arrows, it is proved by cautious research that no more than twenty-five per cent. of the stalks blossom. Why one cane blossoms and another not is not yet clear. Sometimes one field is covered with arrows, whilst a field just near it only contains three or four tassels on different spots in the field. I have known years here when the arrow-

ing was very seldom and the following year it was general, but as a rule the Java planters observe that the arrowing increases every year, a fact that I ascribe to the use of seedling cane from the mountain fields, where it is cut before it reaches its point of maturity. It is evident that when, even in cases that the cane arrows at its highest degree, the arrowing stalks are only twenty-five per cent. of the whole amount, the percentage of arrowing canes may considerably differ and therefore an increase of the tasseling is by no means excluded.

I fully agree with those who assert that the juice of blossoming cane is less valuable than that of cane which does not bear an arrow, but during the arrowing period only. Afterwards when the tassel has fallen off, the juice recovers and gets as good, sometimes even better, than that of cane from the same field, which did not arrow. The grinding time sets in the middle of May, in a time when the arrows have already fallen off, hence no cane is cut and ground here during its flowering time but always some months afterwards, when the influence of the arrowing has already been neutralized.

From my experiments, mentioned in the *Sugar Cane* of February, it follows that the only visible influence of the arrowing of cane in *Java* is the loss of planting material, as a stalk which has blossomed gives no seedling.

H. C. P. GEERLIGS.

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#### WITH OUR READERS.

The letter of Mr. Geerligs on the tasseling of sugar canes in Java, shows that the tasseling period is later there than with us, Java being eight degrees south of the equator. Cane tassels here in November, and in Java in March. And as a rule planters there never grind the cane till two or more months after the tasseling period, when the juice has recovered its normal strength. A fact stated by G. has never been noticed by us, namely, that all the cane in a field does not tassel, and that the number of tasseling canes appears to be on the increase. It is a well-known fact that mountain canes, or canes grown at high altitudes do not tassel so freely as those grown lower down, and some not at all, but

we were not aware that such canes planted lower down retain their well-known habit. One variety of cane that grows here never tassels, but we have never heard any reference to its juice being any weaker at the usual tasseling period of other canes that do tassel. The weakness of the juice in tasseling times is attributed to the large amount of water drawn up the stalks by the rapid growth of the arrow and blossoms. When this growth ceases, the sap resumes its normal condition, but it requires two or more months to do so.

—An interesting though somewhat lengthy article on new cane varieties and cane diseases, on page 449 will interest planters, as showing how universal are the pests and diseases of sugar cane. The statement made by its author that 28,800 borers were taken from a cane field in one day by eleven children, in Fiji, seems incredible, and shows, if true, to what extent those pests can multiply, under favorable conditions. Nothing like it has ever been possible here, unless perhaps at Hanalei, Kauai, where cane planting had to be abandoned on account of the borers. The best, perhaps the only sure remedy is frequent planting, allowing a field to ratoon, not more than once. Burning the field at the close of harvesting is also a good check to the increase of this pest, where it becomes very troublesome. It will be noticed that Hawaii is credited with introducing the borer to Fiji, in common with canes from other countries.

—The article on bananas and plantains shows the great variety of ways in which these fruits may be used as food. The plantain is seldom seen growing here, though in some other countries it is a favorite fruit. As stated in the article referred to, the two fruits may be distinguished in this way—the banana can be eaten raw, when ripe; the plantain, which has a reddish skin, is not fit to eat unless cooked. When properly cultivated, the banana is one of the most profitable crops, the average number of bunches per acre being about six hundred, worth to the grower, fifty cents per bunch on the wharf. The banana plantations here are mostly in the hands of Chinamen.

—The account commencing on page 474, showing the commercial growth of the German Empire, indicates that that nation is destined to outstrip England and America in the

rapidity of its trade expansion. She has already astonished the world as to her ability to produce sugar, but this has been done solely by a system of bounties, which cannot always be kept up. The entire article abounds with information which will be new to most readers.

—Sometime ago the Kona Coffee planters complained that they could not induce their lady birds to stay on the coffee trees, as all preferred the more attractive guava bushes. The same trouble was experienced in California, until one fruit grower commenced by coaxing them to stay and breed under tents, from which they took to the trees around them, and are now giving all the satisfaction that could be desired. Perhaps these tiny lady birds, like some persons and domestic animals, prefer being coaxed rather than driven.

—Cuban plantations and mills may seem an old story to some readers, but as there is a little rivalry between Cuba and Hawaii as to which can do the best work, it is well to keep posted regarding her big mills, which can turn out thirty thousand tons a year, against our twelve or fifteen thousand tons. The story is very cleverly told.

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### *SAN FRANCISCO MARKETS.*

From Williams, Dimond & Co's latest circular, we cull the following items:

The demand for refined sugar is fair and the importation of Hong Kong refined continues in considerable quantities. The importation of this sugar, together with the increasing production of beet sugar in this state are already having their effect upon the importation of other foreign sugars, and had the bounty, according to the McKinley bill, been continued, this coast, after a short period, would have supplied enough sugar for consumption here, and would doubtless have been an exporter of sugar. The Alvarado and Watsonville beet factories are about ready to start up for this campaign, but the Chino beet factory has been at work for several weeks. The sugar per centage in that section is the highest ever known, in some places running over 16, and some individual tests have gone to 25.

The increased firmness previously shown in sugar has not

been maintained. Our latest mail advices from Germany of recent dates state that prices are not expected to go much higher, particularly for the present. The shortage in crops that have been reported at various times, there still remains about 805,000 tons more stock in all the principal countries than last year. This must be entirely wiped out before there will be any actual scarcity of sugar. Latest reports from Java received here recently, state that out of a crop of about 500,000 tons about 200,000 tons have already been sold there, a great part of which will find its way to America.

CUBA CROP.—Condition of affairs, as far as we can learn, continues about the same as previously advised, and it is impossible at this time to state anything accurately concerning the prospects of the next crop, as it is entirely uncertain.

Our latest telegram from New York of this date quotes no change in centrifugals, and no special features of importance regarding sugar. Granulated, 4.18 (a further decline). Beets, 9-18 $\frac{1}{4}$ . Certificates, common, 107 $\frac{3}{4}$ . Preferred, 102.

RICE.—Island rice has ruled weaker, and we quote price 4 $\frac{1}{2}$ c., nominal, although this would be shaded by sellers in order to effect sales. We quote Japan at 3-95 regular, Saigon, 4c. regular, and Mexican at 4 $\frac{3}{4}$ @4 $\frac{1}{4}$ c.

KONA COFFEE.—We quote price at 20@20 $\frac{1}{2}$ c. Regular stock in first hands is cleaned up.

FLOUR.—G.G.E.x Family, \$3.35 per bbl. f. o. b.

BRAN.—Fine, \$11.50; coarse, \$12.50 per ton, f. o. b.

BARLEY.—No. 1 Feed, 62 $\frac{1}{2}$ @65c. per ctl., f. o. b.; ground or rolled, \$14 per ton, f. o. b.

OATS.—Fair, 95@97 $\frac{1}{2}$ c.; choice, \$1@1.05 per ctl., f. o. b.

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### THE LATE EPIDEMIC.

It is a matter for public congratulation that the cholera epidemic, introduced by the steamship *Belgie*, has been brought to a close, by the prompt action of the Board of Health, and with the active co-operation of resident physicians and citizens of Honolulu. Had this disease gained a firm foothold here in the city, or had it reached either of the other islands of the group, there is no telling when or how it could have been stamped out, or how great a public calamity it might have proved to be politically. Isolated cases may yet occur, but such need create no alarm, for, with the experience already had with this disease, they can readily be guarded and kept from spreading.

In the event of any epidemic visiting us in future, it seems necessary that some further provisions require to be made by the Government or the Legislature. Among them, that of granting to the local Board of Health more specific and paramount authority throughout the group; to establish the length of quarantine for each class of epidemics, not only in this port but for each island and district in the group; appointing boards of health on each of the other islands, subordinate to the authority of the central board, with regulations defining their authority, and making any interference with such regulations a misdemeanor. Whatever defects experience may have shown to exist in the present law should be provided for at the coming session of the Legislature. This may appear a trifling matter to some, but recent events show how easily a conflict of authority might arise. The old adage of "an ounce of prevention," etc., never was more applicable than in this case.

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#### MISTATEMENTS CORRECTED.

In a recent number of the *Manchester Sugar Cane* appears the following item:

"We hear from Hawaii that the cane in the drier and larger cultivated districts of the islands is deteriorating, though there are no complaints from those parts where irrigation or a sufficient rainfall exist. The Lahaina cane, which was formally almost exclusively planted, and considered the richest and most profitable, is in these drier parts being to some extent replaced by the Rose Bamboo. There are great complaints of poor results, in consequence of drought and low prices."

The Lahaina cane is a more delicate plant than the red varieties, and to flourish in perfection it requires a warm lowland plain. In its favorite locality, it is unsurpassed by any other. Nor has it deteriorated here in any manner whatever. On the contrary, it may be said to be improving, where its growth is assisted with rich fertilizers adapted to its needs. The largest yields of sugar in this country have been from this variety. Some planters on Hawaii who tried it on their highlands, where it did not thrive as well as it does lower down, have had to replace it with the Rose Bamboo, which is more hardy and a splendid cane for the highlands, and does well in some places as high as 1500 and 1800

feet elevation, exceeding in yield every other kind for those localities. This probably gave rise to the mistatement referred to, which has no truth in it.

For the lowlands and when properly cultivated, Lahaina cane has no peer in this or any other country when grown in its own favorite locality. Probably nine-tenths of the sugar produced in this country is from this variety, and if no disease attacks, it will continue to be so for many years to come. It has shown much immunity against diseases.

In the *Louisiana Planter* of August 31, a statement is made, based on an item in the *Commercial Journal*, a periodical recently commenced in this city, that the crop of the Hawaiian Islands for 1896 will be 237,622 tons. The editor of the *Commercial Journal*, finding that he was altogether off in his reckoning, in the next issue corrected his figure, and reduced the estimate to 175,000 tons, which is the highest figure named by any of the sugar agents, though the more conservative place the crop at 170,000 tons. The weather throughout the islands has been remarkably favorable for the cane and rice crops, and if no disaster should overtake them in the shape of blight or borers, the outcome will be about the estimate given here. There have been no new plantations started the past three years, and the crop of 1896 ought to be as good as that of 1894 (166,432 tons) or even better.

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COLONY OF VICTORIA.—An idea of the horticultural resources of Victoria, South Australia, may be formed from the following statement in *Rural Industries*, published at Melbourne: The various kinds of fruits gathered for the season of 1893-94 in the colony of Victoria we learn were: Apples, 462,834 cases; pears, 103,569 cases; quinces, 53,440 cases; plums, 157,249 cases; persimmons, 44 cases; cherries, 69,601 cases; peaches, 50,577 cases; apricots, 35,672 cases; nectarines, 857 cases; oranges, 8,352 cases; lemons, 4,339 cases; loquats, 035 cases; medlars, 112 cases; figs, 5,518 cases; passion fruit, 22 cases; raspberries, 10,713 cwt.; strawberries, 3,632 cwt.; gooseberries, 7,977 cwt.; mulberries, 1,228 cwt.; blackberries, 7 cwt.; olives, 188 cwt.; currants, 2,196 cwt.; melons, 11,228 cwt.; rhubarb, 17,250 cwt.; tomatoes, 35,676 cwt.; almonds, 23,957 lbs; walnuts, 29,795 lbs; filberts, 2,169 lbs; chestnuts, 2,232 lbs.

## NEW CANE VARIETIES AND NEW DISEASES.

[BY HENRY TRYON, QUEENSLAND GOVERNMENT ENTOMOLOGIST.]

A considerable number of those engaged in cane cultivation having seen reason to conclude that Rappoe cane, the principal variety grown, not only in the Wide Bay and Burnett districts, but also in other parts of Queensland, is deteriorating, and is in consequence of this addicted to disease, a desire to obtain cane from other countries to take its place—notwithstanding the eminent degree in which the Rappoe variety in other respects meets the requirements of the local industry—has naturally arisen. This feeling found special expression at a meeting of the Bundaberg Planters' Association, held on 26th October, 1894 (*vide Queenslander*, 3d November, 1894). In introducing new varieties, however, the planter can be never certain that the end he had in view in doing so himself, or in urging it to be done by others in his behalf, is sure of accomplishment. Whatever the reputation a cane may bring with it from one sugar-growing country, he cannot definitely assert it will sustain in its new home, and when subjected to altered conditions as regards environment. He should therefore regard his work in the light of an experiment, and not embark at once on a big venture. But there are even stronger reasons for enjoining this cautious procedure, for whilst introducing new varieties of cane he may be the means of establishing in our plantations new diseases, the extent of whose injuries he cannot control, which may even jeopardise the existence of the industry in which he is engaged.

The occurrence of a disease, which itself appears to have been introduced from Bourbon in the sugar cane at Mauritius in 1848, prompted the planters of the latter country to send to Ceylon for a change of cane for the purpose, as has been stated, of regenerating the different species of cane already cultivated there. These canes arrived in November of that year, but meanwhile it had been reported that the canes of Ceylon were ravaged by a special borer, and an opinion had been expressed that it would be dangerous to introduce into Mauritius cane infested with it. The whole ship's cargo was consequently condemned, but owing to the

lax manner in which official instructions were carried out, the Ceylon insect was at this time added to the plagues which the Mauritius planter had to bear, and it had made its presence so severely felt that in 1855 Governor Higginson was constrained to appoint a committee to make it the object of special investigation. But undeterred by this event, and possibly at first in consequence of it, the Mauritius planters pursued the same tactics. As soon as anything affected their cane, whether this was the outcome of adverse meteorological conditions, bad cultivation, special importation, or what not, they felt a desire to introduce new seed "*pour regenerer les differentes especes des cannes cultivees dans la colonie,*" and no sooner experienced it than cherished and gave effect to it. There has therefore been at Mauritius since 1848, as has been stated by Dr. Kottmann, a "continuous record of disease in all sorts of cane," first one variety then another being affected, and in some instances almost wholly destroyed. In 1850 it was the Canne Blanche that thus suffered, then Penang cane, then Belouquet, and then Bamboo Rose (our Rappoe), and Scambine were successively the victims of one malady or another. The result of all this is that to-day, though Bamboo Rose there may be, as has been shown by Boname (*Revue Agricole*, viii., 8, p. 183, Aug. 1894), yield, even when diseased, a juice containing as much as 24.3 per cent. of sucrose, a good deal more than half the area under cane is planted with Port Maclay (our Cheribon), which in the Mauritius, as elsewhere, is a variety of very inferior saccharine properties, both when regard is had to the amount of sugar that its juice contains as well as its quotient of purity, being in fact the worst cane grown there when looked at from this point of view. Should the Queensland planters here be compelled by similar events to so largely confine their attention to growing Cheribon, it is doubtful whether the sugar industry could exist.

Jamaica has adopted an opposite policy, preferring to bear the ills it has than seek to regenerate the cane in the manner pursued by Mauritius, for, according to C. A. Barber, Superintendent of Agriculture, "it has been considered necessary there, on account of cane disease, to quarantine Natal, Southern India, Ceylon, Mauritius, Java and Fiji."

The progress of scientific discovery is continually bringing to light new cane diseases, which ere this have been regarded under the general term "degeneracy," and as illustrating various forms of it, and doubtless additional discoveries in this direction will be the outcome of further research. These are the matters of concern for other sugar-growing countries. But the Queensland planter has not only to guard against injury he knows not of, but also against certain cane diseases whose existence has been already ascertained, and which have been properly characterized. Not to go far afield, we have in Java the notorious "Sereh" disease, the injury effected by which baffles the enterprise of the ablest experts bent on its extermination. We have also a disease there *Het Rood Snob*, which also continues to make progress, and which it was feared by H. van Ingen, in 1893, would occasion considerable loss to the planters. Coming nearer home, we have in British New Guinea what appears to me to be a new cane malady which is very fatal within the limits of its occurrence. This will be again referred to.

If, further, in the category of disease we include the insect enemies of the sugar cane, the notorious beetle-borer (*Sphenophorus obscurus*) of New Guinea, Fiji, Sandwich Islands and elsewhere, must likewise claim attention.

That the danger of introducing new diseases into the colony with new varieties of sugar cane is more than theoretical may be concluded, on considering the following instances of such occurrences that have recently come under my notice, and which are to be found referred to in official reports that I have already furnished. Importance of the subject will justify their being described in detail:—In 1893, this Department undertook to introduce samples of the different varieties of canes which were known to occur in British New Guinea, and for this purpose despatched one of its officers, the overseer of the State Nursery, Cairns, in May, 1893, on a visit to the Protectorate. As an outcome of this visit 11 different kinds were brought over, and with the exception of a few examples of each that were retained for observation, the whole collection was distributed equally amongst the contracting parties. And whilst visiting the State Nursery, Mackay, both in September, 1894, and three months later, I

found that the New Guinea cane growing there derived from this source exhibited in the case of each variety the occurrence of a cane disease that was not only new to me, and possibly to science, but also sufficiently injurious to claim special attention. Fortunately in this instance it was possible to take steps not only to stay the dissemination of the malady, but also to exterminate it. But insomuch as traders to New Guinea are from time to time making overtures to our planters expressing their willingness to procure them cane from the same country whence this was derived,\* and who, it may be fairly anticipated, might not be more careful in their selection than would a responsible government official, the probability of a second introduction of this cane disease taking place is at least other than remote. It is important, however, that if it does arrive here it may be promptly recognized. A quotation from the report referred to, dated 29th December, 1894, may therefore be appropriately added:

*"Symptoms.*—The features that it presents are the following: Briefly stated they consist in the gradual but complete death of the foliage. At first the extreme terminal portion of each leaf changes to a pale-brown color, wilts, bends over, and become hair-like in appearance. Then similar alterations gradually proceed towards their bases until their entire substance becomes involved in decay. When but little developed, a narrow pale-brown band is noticeable, passing downward from the apex of the leaf along each side, and as the disease progresses, this band, step by step, encroaches on the central portion of the leaf-blade on each side of the midrib, and so widens and extends until, with the exception of this portion only, the whole leaf proper is affected; though even prior to this, and the loss of its green coloration, it has become infolded and wilted. The midrib is in turn affected, but is the last to participate in the change, and remaining for a time turgid and prominent, stands out in bold relief amongst the discolored leaf-tissue that surrounds it, and with

\* "We learn (writes the Bundaberg Mail, of the 9th November, 1894.) that negotiations are proceeding for the charter of the schooner 'Morning Light,' owned by Messrs. Manchester and Scott, and commanded by Captain Hugh McIntosh, to proceed to New Guinea on behalf of some of our leading planters for a consignment of sugar cane. The species intended to be imported is one that has been already favorably reported on and which will be procured from a plantation adjoining the Fly River, at no great distance from the border of the Dutch Territory. The 'Morning Light' is now loading timber for Townsville."

which its still green color is a striking contrast. Similar alterations next involve the leaf sheath, which until now has remained unaltered, until ultimately the whole shoot or cane becomes dead and discolored. Though the entire foliage of a shoot is almost simultaneously affected, it may be observed that it is the outermost leaves that are so first. A plant again may manifest the disease in every portion of its growth at the same time, or in but one or two shoots or canes only, whilst the malady may successively develop in others which are then apparently unaffected.

"It may display its presence at any period in the growth of the cane, but it is more quickly fatal to young plants,\* whereas it may remain comparatively dormant in those which are either fully or nearly fully developed. When a mature cane is affected this gradually dies down from its leafy top succumbing, however, very slowly, and whilst doing so emitting shoots from its lateral buds. Plants in the earliest stage of the disease are not generally to be distinguished from such as are quite healthy, being neither stunted nor in any way abnormally developed, and not manifesting in their foliage either lack or excess of green coloration. On examining the main stem when the disease is first noticeable, no alteration is discernible with the 'naked eye' in its tissue, nor are there any evidences of arrested growth. As the malady progresses, however, what appears to be secondary changes supervene, for reddish fibres may then be perceived to traverse the nodes, and a slight alteration of color to characterize the internodes (joints). This especially happens with that portion of the stem which is beneath the surface during growth. Affected plants, moreover, are endowed with an abundance of roots, though the recently developed ones are perhaps less numerous than they should be.

"The disease is hereditarily transmissible. Thus, in every case in which it was discovered in young plants, the original stools of cane, belonging to like varieties to those that they

\* As an instance of the rapidity that may characterize the development of the full virulence of the disease in the case of plants that are but two or three feet high, it may be stated that on the 30th November the officer in charge at the State Nursery overlooked several rows of young New Guinea "plant cane" (derived by propagation from the original sets received from Kamierunga) in quest of "borers" (*Noagria*), and removed the shoots that in evincing any symptoms of decay might appear to be injured by them. Yet by the 17th of the following month the disease had not only already manifested its presence in the case of several stools, but one of these had even virtually entirely died, though the stems were as yet still green.

represented, and from which they had been derived, were also victimized by it.

"That it is not infectious under ordinary conditions may be presumed from the fact that cane grown alongside that which is diseased may remain entirely healthy, notwithstanding its source or the variety that it represents. On the other hand, it cannot be affirmed, or even safely presumed, that cane afterwards raised in soil in which diseased plants have grown will remain free from it, as the immunity implied in such case has as yet to be demonstrated.

"The following varieties of New Guinea cane were noticed to be subjected to the disease, and, in the case of each one enumerated, it was found that it affected in part both the original plants derived immediately from the Protectorate, and the plants that had been obtained from them by propagation:—*Mahoann* (one only out of six original stools that were alive diseased); 2, *Chemoma*; 3, *Oraya* (one of the canes to be worst affected; two out of seven original stools that remained, diseased); 4, *Arabora*; 5, name undetermined; 6, *Kakeria* (large proportion of original stools diseased); 7, *Mabuan*; 8, *Nave*; 9, *Moo Moo Boku* (these three canes failed to become established at the State Nursery, through disease); 10, condition not ascertained; 11, name not ascertained, but cane badly affected.

"The above-mentioned disease of the cane is quite distinct from the so-called Gumming Disease (a careful inspection of the cane at the State Nursery, in December, 1894, failed to reveal the presence of this anywhere therein), as it is also from Sereh and from Rust (cane freckles), and, in fact, it seems to differ from any other affection known to the writer."

As a further instance, serving to show how well-founded is the apprehension of danger to the interests of planters, likely to arise from the introduction of cane from without, the following incident may be described: It has been already remarked that at a meeting of the Bundaberg Planters' Association, held on the 2nd October, 1894, the expression was very generally given of a desire to acquire new cane from some distant cane-growing country, Honolulu and New Guinea being especially mentioned. This desire ultimately took the form of a resolution to the following effect: It

being decided "That the Agricultural Department be asked to procure — tons of cane from Honolulu of different varieties free from disease, the planters guaranteeing to defray expenses." As the outcome of this, as you are aware, a large shipment of cane arrived in Brisbane, in March of the present year, to the order of this department, as agents of the Bundaberg Planters' association. This consignment was accompanied by a guarantee from the consignors, in which it was stated that it was free from disease, but that it could not be affirmed that it was free from cane-destroying insects, as it came from a country in which such were prevalent. The condition of this cane was then inquired into by me, and a report embodying the results of my inquiry submitted. The cane was then forwarded to its destination, but, fortunately, accompanied by a copy of the report in question. In this it was stated as follows:—

"The cane harbors living examples of a destructive beetle-borer (*Sphenophorus obscurus*), which is to be met with in probably not less than 1 per cent. of the sets. This particular insect is not known as occurring in the canefields of the colony, but is identical with the one I have already reported as occurring in New Guinea cane, and which I have already also previously brought under your notice as having been met with upon another parcel of Honolulu cane on its arrival at Bundaberg. It is also the sugar cane pest whose introduction I recently urged the Bundaberg Planters' Association to strenuously oppose.

"The borer in question is a glossy white much wrinkled footless grub, measuring about  $\frac{5}{8}$ -in. in length, and is the young of a reddish-brown weevil measuring about  $\frac{1}{2}$ -in. in length.

"In addition to its occurrence in the Sandwich Islands and New Guinea, it is also reported as having been met with in New Ireland, Tahiti and Fiji.

"The following facts relating to it and its destructive work may profitably be considered in connection with its arrival here:—In 1883 it does not appear to have as yet attacked the sugar cane growing in the Sandwich Islands, for in a notice of the sugar cane borers in the Hawaiian Islands, occurring in the Hawaiian *Planters' Monthly* for July of the year, no men-

tion is made of it. It was met with, however, there shortly afterward. The Rev. T. Blackburn and D. Sharp, writing in 1885, speak of it as having been already introduced there, and although they did not mention at the time that it attacks sugar cane, they refer to it as having been observed 'in the stems of bananas on the mountains.' But by 1888 it had assumed the role of a sugar cane pest in the Sandwich Islands plantations, and its destructive work there was now a matter of concern, for in this year it was referred (as we learn from 'Insect Life'), by King Kalakaua to the United States authorities in economic entomology, who reported that, 'judging from the specimens of sugar cane received, the damage caused by the beetle must be very great.'

"From the Sandwich Islands it is supposed to have been introduced into Fiji. Mr. A. Koebele, entomologist to the Hawaiian Government, reported to the Secretary for Agriculture, United States of America, in 1892, as follows:—'The most injurious insect upon these islands [referring to the Fiji group—H. T.], is unquestionably *Sphenophorus obscurus*, Boisd., introduced on sugar cane some ten years since from the Sandwich Islands, and at the present time infesting nearly all the canefields. At Nausori Mills [Rewa River—H. T.], so Mr. Seeliger informed me, 52 per cent. of the entire cane from some fields is infested with the *Sphenophorus* larvæ, and if we consider that in some instances half of the cane is destroyed by this beetle before reaching maturity, the extent of the injury done can be estimated. \* \* \* No parasites as yet prey upon these larvæ, and unless some are introduced to check the ravages of the beetle, cane-growing will be almost an impossibility in the near future. So numerous is the insect already that within one day along the border of the field at Nausori, under pieces of split cane laid out for bait, eleven children collected no less than 28,800 of the beetles.

From another source, a publication issued in the succeeding year, *i. e.*, 1893, by the Colonial Sugar Refining Company, we learn that 'from Mr. Seeliger's records, kept of the damage alone done in the cane stalks taken for analysis, 18½ per cent. of the whole crop was damaged by the beetles in 1891, and 13½ per cent. in 1892 [after vigorous measures had been meanwhile resorted to, to check its increase—H. T.], which does

not include the cane actually destroyed by the beetle and left in the field ;' also, that 'these insects, under favorable conditions, multiply at a terrible rate.'

"Destructive insects, when once introduced to a new country, do not, as a rule, render their presence felt for a year or so, and judging from the above quoted experience of the country whence this cane now referred to has been derived, the same may happen here in the case of the beetle-borer under notice, should it become established in our plantations, and that when this has once taken place, the *Sphenophorus* will ultimately exert here ravages as extensive as elsewhere is more than probable. In Fiji, however, and also in Hawaii, a class of labor that cannot be otherwise remuneratively employed is available for collecting the beetles and so checking their increase, which is not the case in this colony.

"At present I am unable to confidently recommend any practicable method for successfully treating the cane plants (cuttings), infested by this beetle-grub, which, whilst effecting its destruction, will be without injury to the "sets" themselves, and especially so since their vitality is already impaired as the result of a long sea voyage. Should the cane be picked over with a view to discard worm-eaten or grub-infested plants, even then, in spite of a very close security, all that might be described as such is not likely to be discerned, for in many instances the only outward symptoms of the presence of the 'borer' are afforded by the existence of the diminutive hole in the rind where the egg has been originally inserted, with or without, in addition to this, a faint-brown discoloration where this has taken place, and a somewhat more pronounced one in that part of the rind also that may happen to cover the mature grub, pupa, or beetle, pending the arrival of the time when the last-mentioned is to emerge.

"Again, it seems that little benefit would be derived from the employment of insecticidal washes, unless such potent ones be employed as would determine the vitality of the plants themselves. The perfect insect, as a correspondent informs me, will withstand submergence in the ordinary lime sugar cane wash for some considerable time. Moreover, the insect whilst within its tunnel in the plant—at least in these grub-infected stalks that occur in this consignment—is be-

yond the reach of insecticidal agents that do not pervade also, and so destroy the plant-tissue itself, for as it excavates it fills all that portion of the tunnel which it has lately occupied with macerated fibre closely felted together, and when about to become a pupa or chrysalis protecting itself again in a cocoon of coarse cane fibre wrapped around.

"In conclusion, I may add that the plants appear to have been selected with very great care, and in no instance was one obviously showing injury due the presence of the *Sphenophorus* was observed; but this circumstance, of course, whilst it exonerates from blame those by whom the seed cane has been supplied, increases, as has been already stated, the difficulty of separating the unsound from that which is unaffected."

It may be added that the danger of introducing the same formidable sugar cane pest from New Guinea is even greater than it is from the Sandwich Islands. In the Annual Report of the Department of Agriculture for 1893-94, Mr. Ebenezer Cowley, overseer of the State Nursery, Kamerunga, in referring to New Guinea sugar cane, states as follows:—"It might be well to note here that many varieties of sugar cane seen by me in New Guinea were so devoured by insect pests that clean specimens were not easily obtainable;" and in the collections that he secured it is not surprising therefore that the *Sphenophorus*, which as before remarked inhabits New Guinea, occurred; this insect manifesting itself, first in the small portions of the shipment that was retained at Kamerungo, in which its occurrence was proved by myself; and afterward in the cane that was forwarded to New South Wales, in which its presence was detected by the able entomologist of that colony, Mr. S. Olliff.

How, then, it may be asked, is the risk to be avoided in procuring new varieties of cane? In the first place we must ascertain the diseases and the insect pests that affect sugar cane in other countries from which importations are contemplated but not already in this; and in the second that the standing crop from which seed cane is to be procured harbors none of them; and we must ascertain this as the result of actual inspection on the part of a responsible expert.

It may, however, be remarked, as already pointed out, that notwithstanding the high reputation that a particular cane

may enjoy in one country as the possessor of desirable qualities, it may not retain these qualities when transferred to another; and then, again, the possession of the character of being either a "heavy cropper" or a yielder of juice rich in sugar does not necessarily connote that a variety of sugar cane is "disease proof," but, as concerns this gumming disease, probably the reverse. Mr. E. W. Knox, general manager of the Colonial Sugar Refining Company, has stated, in a letter to the *Queenslander*, dated 22nd November, 1894:—"I am at a loss to know where disease-proof canes are to be found;" and he proceeds to add, concerning the very cane to introduce which it has been thought justifiable to incur the risk above described: "In Fiji, we have been compelled to substitute other varieties in many of our fields for the Honolulu *Lahaina*, which formerly gave very good results."

Again, it may be added, it is questionable whether all the beneficial results likely to accrue from the introduction of cane from beyond the colony would not be secured by paying heed to the source of the seed cane now being used, and exercising more judgment in this respect. The different canefields of Queensland, when compared one with another, will be found to exhibit differences of soil and climate, (and even in some instances this may be true of the plantations of a single district), as great as those that obtain not infrequently between the cane-growing countries remote from one another or from the colony. Moreover, it is these very differences that determine the desirable qualities in cane that are sought. There is little interchange between the different canefields in the matter of cane plants, and yet it appears from these considerations there should be, with the probability of highly beneficial results accruing, always provided that this change of "seed" does not result in cane diseases of local occurrence being generally disseminated. If new varieties of cane are wanted, numbers are already to be secured. The nurseries of Queensland and New South Wales already contain cane derived from almost every sugar-growing country. If, however, in any emergency cane in great quantities is needed, those who require it will have to go further afield for their supply; but exercise such precaution as is enjoined in a preceding paragraph.

### *A CUBAN SUGAR PLANTATION.*

A day spent on a Cuban sugar plantation is something to be treasured in memory as one of the pleasurable experiences of a lifetime. There are few articles of daily use with which the consumer is less familiar with its methods of production than is the case with sugar. Everybody knows in a general way that it is the evaporated juice of the sugar cane, but beyond this fact few know anything of the intricate processes through which the sap must pass before it appears in a condition fit for table use.

Cienfuegos is the great centre of the sugar plantations of Cuba. Here are two plantations—the Consuelo and the Soledad—the total annual production of which amounts to over sixty-four million pounds—an average of one pound each for every man, woman and child in the United States. As the smaller plantations in the neighborhood of Cienfuegos have an annual output of many million pounds more, it is not surprising that there is frequently a fleet of 100 ships lying in the harbor awaiting cargoes.

Formerly the Cuban planters did not follow the process of sugar making further than the conversion of the sap into molasses, producing a quality of the syrup known in the trade as “boiling molasses;” that is, molasses intended for conversion into sugar and not for table use in a syrup form. Recently, however, the Cuban planters have found it profitable to erect mills, and to-day sugar raising in Cuba is reduced to a science. The making of sugar, as now practised, requires costly and extensive plants fully equipped with the most intricate and expensive machinery, and requires a much larger capital than in the old times, when the chief requisites for a sugar mill was a pair of heavy rollers, crudely operated, for crushing the cane. A plantation fully equipped to produce 5,000,000 pounds of sugar annually now represents an investment of nearly half a million of dollars. The smaller planters could not compete with the large ones were it not that the large amount of capital required has led to the division of sugar making into planting and manufacturing. It is only the very largest and wealthiest planters that carry on both branches of the industry on their plantations. The

desire on the part of the small planters to manufacture their cane has led capitalists to invest in what have been known as "centrals." These are mills erected in some central locality—hence the name—within easy hauling distance of the plantations. These "centrals" are the small planter's salvation. Without them he could not compete with his wealthy neighbor, and would be driven out of business. The usual method of operating a "central" is on a percentage basis. The planter delivers his cane to the mill and receives a percentage of the sugar obtained. Other mills buy the cane at so much per cord.

It was nearly three centuries ago that the first sugar plantation was started in Cuba. For 250 years very little progress was made beyond extending the area of the plantations. The processes were crude and necessarily wasteful. Oxen were employed in grinding cane, and the machinery used was of the simplest construction. It was not until about fifteen years ago that the Cubans made much attempt at reduction of the work to a science, but in that time great progress has been made, until to-day Cuba can show some of the most expensive, best operated and most profitable mills in the world.

The common people of Cuba have passed from slavery to freedom and to-day, all things considered, the Cuban negroes are the best paid set of people of their class on the face of the earth. They live quite as well and as cheaply as our Southern negroes, and are in active demand at good wages. On the steamer from Nassau to Cienfuegos I met several Cuban planters, who expressed themselves as anxious to engage a number of experienced "plantation" negroes at \$2 a day, for a period of twelve months. This season experienced plantation labor has been difficult to secure at any price. The crop has been unusually large, and the various other industries that have recently been started, notably the iron mines at Santiago de Cuba, have created a demand for laborers in other than the cane fields, and the influx of immigrants has not kept pace with the times. The Spanish government has tried several schemes to stimulate emigration to Cuba, but none successfully attracted desirable immigrants in any great numbers. The average Spaniard looks upon

Cuba as his legitimate "government pap," and only goes there as a soldier or official. He regards the Cuban as his semi-slave, created only to labor for the Spaniard. To go as a laborer is furthest from the Spaniard's idea of Cuba. He must go either as a gentleman or a brigand.

The past season has been a very prosperous one for small and large plantations alike. It is in the bad seasons that the small plantations suffer most. The amount received from the "central" for the crop of cane does not represent so much clear profit by any means. The raising of sugar cane and its conversion into sugar is now carried on just as close a margin as the cotton, boot-and-shoe, or any other of the great industries of the United States. It is only by the employment of the most approved methods and strict economy in manufacturing that there is even the slimmest margin of profit.

It is at Soledad plantation that the highest perfection in economic sugar making has been reached. This plantation ranks as the best managed and its mills as the most expensive on the island of Cuba, if not in the world. It is not the largest plantation by any means, as the Consuelo produces two and one-half times the number of pounds annually, but here American methods are followed and even improved upon, and the management looks after every economy as closely as the cotton mill owner of Massachusetts watches every spindle in his mill for waste.

To reach Soledad, I take a small steam launch from Cienfuegos during the early morning hours. As we steam along past the many islands that dot the harbor and serve as summer residences for the wealthy Cubans, the scene is even more enchanting than a sail through the Thousand Islands of the St. Lawrence or among the more rugged islands that dot the placid waters of Puget Sound. The delightful sail is continued a few miles up the most picturesque of little rivers, where we disembark and take a short railroad ride, which lands us at the sugar works and plantation house. We were here met by Mr. Murray, the manager of Soledad. I had been told by Mr. Williams, the consul-general that if there is any one on the island of Cuba who can run a sugar plantation profitably it is Mr. Murray, and this in face of the fact

that Mr. Williams is not inclined to look upon sugar raising in Cuba as being a profitable industry.

First we drove out to the fields where the cane is being cut. Right here we strike one of the economies wherein a large and wealthy plantation can harvest at a lower cost than its smaller neighbor. On the small plantation the cane is cut and loaded onto large carts drawn by from two to four yokes of oxen or bulls. Even though large loads of several cords are drawn, it is a slow and expensive operation compared to that at Soledad. Here narrow-gauge railroads run to the cane fields and the cane is loaded direct into the cars, drawn to the mills and unloaded onto a broad carrier traveling up a long incline and fed to the rollers of the great mill.

Quite an army is employed in cutting and loading the cars, but so expeditiously is the work carried on that the juice of the cane which we see being cut this morning will be boiling in the vacuum pans before 3 P. M. The cutting of the cane is done with an instrument that looks like a compromise between a sword and an overgrown butcher knife. The blade is about three feet long, with a big wooden handle from six to eight in length. The blade is one-fourth inch or more in thickness along the back, and the only portion that is dangerously sharp is a few inches at the point. The cane-cutters carry their big knives with them on all occasions during the cutting season. Meet him where you will, at the cafe, on the street, in the stores, groggery or grocery, or even at the early masses at the churches, and he has the clumsy-looking instrument dangling unsheathed from his belt, or if it be an old one and half its length ground away, the chances are that the handle will be seen protruding from his boot-top. It is the distinctive mark of his occupation, and he would as soon think of being seen in public without it as the Czar of Russia would think of laying aside the imperial eagle.

The cane is cut close to the ground, the stalk stripped of its foliage and loaded at once on to the cars. The cane bears one crop each year and stands for twelve years, when it must be replanted. The elements of uncertainty in sugar-making begin at the very cutting of the cane. Good judgment must be exercised, or the cane may be cut a few days too early or

too late. In either instance the percentage and quality of of sugar obtained is affected.

As the cane is thrown in armfuls to the carrier which feeds it into the heavy rollers fifteen men are stationed at intervals along the sides of the carrier to distribute the cane so that it may feed into the rollers regularly. Formerly one grinding was considered sufficient, but nowadays in all the best mills the cane is fed through the rollers a second time or passes through a second set.

At Soledad the cane first passes between a set of rollers weighing fifteen tons, and about 60 per cent. of the juice is squeezed out. It then passes on to a second set, and an additional 15 per cent. is extracted. The two streams from the rollers unite under the mill and pass through a strainer, one man being occupied all his time in keeping the strainer clear of refuse and obstructions. When the mills are running at full speed, and they usually are twenty-three hours out of twenty-four, seven days in the week during the grinding season, there is a stream of juice running down the sluiceway, where the conduits from the two sets of rollers unite, that is eighteen inches wide and an inch in depth. The tin cup provided for the purpose is almost always in use by some of the workmen, who quench their thirst from the stream of dirty whitish looking liquid that is anything but palatable to the novice. However, it is both victuals and drink to those habituated to its use, and were it not so dirty looking might be more attractive to the visitor.

The cane juice is now pumped into large tanks in the upper story of the mill, where it is treated with lime which neutralizes the acid it contains. While in the tanks or defecators, the steam is turned on and the juice, with the lime in solution, brought to a boiling point. This has the effect of coagulating the albumen. From the defecators the liquid is pumped into the first of the three great boilers, or vacuum vats, which are not, as many might suppose them to be, immense great pans, but upright boilers. In order that the boiling may take place at as low a temperature as possible, the air in the boilers, or pans, is exhausted by steam pumps, hence the name, vacuum pans. The first boiler is heated to 200 deg., the second to 180 and the third to 150, with cor-

responding vacuums in each. This is known as the triple effect in boiling, and produces a high grade of sugar. The liquid is boiled to a syrup containing 50 per cent. of water and an equal percentage of sugar and the moment it reaches this point of evaporation, it is run off into the "strike pans," where the delicate process of crystallization takes place. The strike pans are in charge of the most expert operatives, and as the hardening process progresses, samples are constantly being tested in the laboratory. As the sugar cools in the strike pans it is carried to the centrifugators. One might suppose from the length of their name that the centrifugators were large machines. Quite the contrary; they are the smallest, but by no means the least important in the mill. They are no bigger than a bushel basket, in fact they can best be explained by comparing them to baskets one set within another. The outer shell or basket is stationary; the inner one is set on a spindle and revolves rapidly. A small quantity of the mixture of sugar and molasses from the strike pans is placed in the inner shell and the spindle set in motion. It revolves at great speed and the mass of sugar and molasses spreads itself over the sides of the revolving shell.

Soon the sugar begins to whiten as the molasses, being the heavier, separates itself from the grains of sugar and oozes through the small holes in the slides and is thrown to the sides of the outer shells by centrifugal force. If there have been no mishaps when the process is completed 85 per cent. is sugar and 15 per cent. molasses. The sugar is collected from the series of centrifugators by machinery and carried to the bagging and weighing room, whence it is taken by rail and lighter to the wharves of Cienfuegos for shipment to New York.

When steam engines were first introduced into use in the Cuban sugar works wood was the only fuel. Experiments were tried with coal, but that proved too expensive a fuel. Then the refuse of the cane was mixed with coal and wood. Now the refuse of the cane, after two grindings, is the only fuel used in all the larger mills of Cuba. Boilers especially adapted to the burning of bagasse, as the sugar cane refuse is termed, have been invented. At Soledad the bagasse is con-

veyed direct to the furnaces and dumped automatically. The fires have only to be kindled at the beginning of the grinding season with sufficient wood fuel to start the grind-mill, and from that on to the end of the season the mill supplies its own fuel. One is here reminded of the old problem of perpetual motion, and can but conclude that a close approach of its solution is made at Soledad. After the mill has started, the feeding of the cane into the crushing rollers supplies the force to keep all the complex machinery of the entire plantation in operation. The crushed and broken cane is carried automatically to the furnaces, and it there supplies the power that not only does the grinding, but all pumping, boiling, etc., required in clarifying the cane juice and its crystallization into sugar.

After inspecting the mill I was invited to breakfast by Mr. Murray, who, together with a number of other Americans, employed at Soledad, occupied the plantation house. It is a typical Cuban house, all the living rooms being on the second floor. The drawing room is, according to Cuban taste, elegantly furnished with cane chairs, settees, etc. A few small rugs constitute the only covering. Carpets are not in general use in Cuba, polished tile floors being considered better adapted to the country, as carpets, mats, etc., serve only as dust collectors and breeding grounds for fleas and other insects.

It is 12 o'clock before the cook announces breakfast. The meal itself is a tasteful one, comprising the best of meats and choice Cuban fruits. Twelve o'clock seems to be a late breakfast hour for most Americans, but it is noticeable that nearly all who take up a residence in this country soon adapt themselves to its ways and peculiar customs. A cup of coffee and roll serve as an early morning meal, and as the heat of the day comes on only common laborers think of working. At 12 o'clock breakfast is served, after which the overseer of the plantation and his assistants devote their time to indoor work, not venturing out unless compelled to, till nearly 3 o'clock.

At 6 o'clock dinner is served and the evening is spent in smoking, chatting, or reading some of the many books supplied in the library, or possibly, a trip is made to some adjoining plantation.—*Cor. Los Angeles Times.*

## USES OF THE BANANAS AND PLANTAINS.

[BY L. A. BERNAYS, C. M. G., F. L. S., PRESIDENT OF THE QUEENSLAND ACCLIMATISATION SOCIETY.]

[MACKAY SUGAR JOURNAL.]

The bulletins issued from the Royal Gardens, Kew, are especially valuable to the ordinary reader, from the fact that, while true to the traditions of that great Institution they never fail to make their papers of interest to the scientific realm, they also make them practical and useful to commerce and to the cultivator of the soil. The bulletin of for August, 1894, especially combines these two qualities in treating of the bananas and plantains; among other information devoting a chapter to the economic uses of the fruit of this important member of the vegetable world as food for the human race.

There is a good deal of confusion of ideas as to the true distinction between the plantain and the banana; and this is increased by the fact that in some English-speaking countries where the fruit is largely cultivated the term "plantain" is of common designation, while in others that of "banana" is as commonly used. Perhaps the best distinction is the application of the term "plantain" to those varieties which are only used for cooking, or are otherwise prepared; and that of "banana" to those which make a pleasant fruit when eaten ripe. *Musa* is the generic term of all, and the term "plantain" may practically be discarded as having no scientific meaning; while in the vernacular there is no common agreement as to what species shall be called by one name and what by the other.

Many of the varieties of the banana and the plantain have adapted themselves thoroughly to the climate of Queensland; and I think it will be a useful work to extract from the Kew bulletins referred to some of the most important methods given for utilizing the fruit for food purposes. I add a few receipts known to myself, and others derived from various sources.

I offer to our Queensland growers and consumers the following different methods of preparation of the fruits—both ripe and unripe:—

1. For bread, it is roasted or boiled *when it is just full grown*, but not yet ripe, or turned yellow.

2. A roasted plantain and a ripe raw plantain together, which answers for bread and butter.

3. Take six or seven ripe plantains, and, mashing them together, make them into a lump, and boil them in a cloth.

4. The ripe fruits make very good tarts.

5. Green plantains, sliced thin and dried in the sun and grated, make a flour which is very good for puddings.

6. The drying of the banana like figs is already well known, and has been practiced with much success in Queensland. There should be a good trade open for this form of preparation, with the interior of the colony, where it is not warm enough to grow the fruit. The method of drying the ripe fruit depends much upon the degree of dryness of the climate. In parts of Mexico where the climate is very dry, the ripe fruits are exposed to the sun until the skin begins to wrinkle. They are then peeled, and again exposed until an efflorescence of sugar appears on the surface, as in dried figs. They are then pressed in masses of about 25 lb each. This process is, however, practicable only in a very dry climate; and where that condition does not exist other methods are resorted to. Of these Simmonds gives three. viz.:—(1) Exposing the ripe fruit to an atmosphere of sulphuric acid gas before attempting to dry; (2) By boiling rapidly in water to which sulphate of lime has been added; and (3) By boiling in syrup. By either of these processes the albumen and caseine of the fruit coagulates, and the well-known tendency of the banana to decay and ferment is arrested. The second method is said to be the best, and has the advantage of simplicity. To expose the fruit after boiling to the sun's rays, trays of bamboo, or anything which is clean and permits the free action of air and light, are used. If rain falls, they are dried in an open oven in a moderate heat, where the air can circulate. The preparation is seen to be very simple; and with the abundance in which the fruit is produced, a profitable industry in dried bananas is open to Queensland growers. The dried fruit has been known to keep good for 16 years.

7. The Darien Indians preserve them a long time, by dry-

ing them gently over the fire, mashing them first and moulding them into lumps

8. The Mosquito Indians will take a ripe plantain and roast it; then take a pint and half of water in a calabash, and squeeze the plantain in pieces with their hand, mixing it with water; and then drink it.

9. When the natives of the West Indies undertake a voyage they prepare a paste of banana, which, in case of need, serves them for nourishment and drink; for this purpose they take ripe bananas, and, having squeezed them through a fine sieve, form the solid fruit into small loaves, which are dried in the sun or in hot ashes, after being previously wrapped up in leaves. When they would make use of this paste they dissolve it in water, which is very easily done, and the liquor, thereby rendered thick, has an agreeable acid taste imparted to it, which makes it both refreshing and nourishing.

10. Plantain meal is a digestible and nourishing food for children and invalids and is simple in its preparation. The fruits after being stripped of their skins are sliced longitudinally through the core, and dried; in the sun if the air is dry, or in a slow oven where the air is allowed to circulate. The slicing must be done with a plated or ivory knife, as contact with iron or steel blackens the fruit. The process of drying should be as rapid as possible, a fragrant odour-like orris-root, which the meal possesses, depending it is said upon this. When the fruits are thoroughly desiccated, they are powdered by pestle and mortar or otherwise, and the meal sifted. The color of the meal is whitish, speckled with minute red spots. Its flavor is bland and pleasant, and, as it keeps well, in the hands of a clever housewife is convertible into many uses. There is no reason why every larder in the colony should not have its plantain-meal canister. Mr. Anderson, writing in *The Technologist* in 1867, says of the plantain flour, that it is decidedly superior to arrowroot as a food for invalids and children, in consequence of its nourishing qualities. The presence of tannin in the meal also gives it a value for use in diarrhoea. There is a pleasant soft fulness in the taste of cake or potage made from plantain flour which will always recommend it. Bananas from their bulk

and perishable character cannot be transported for long distances from the coast into the interior; but in the form of meal, or dried as figs they will pay to carry, and ought to find an extensive market. The yield of meal is variously stated at from 20 to 40 per cent. Upon this point I can bring no personal experience to bear, but am disposed to think from the composition of the fruit, that the higher of the two percentages most nearly represents the produce of meal.

11. In the green state and cooked in various ways plantains supply the staple food of millions of people in tropical America. About  $6\frac{1}{2}$  pounds of the fruit or 2 pounds of the dry meal with a quarter of a pound of salt meat or fish form in the West Indies the daily allowance for a laborer. In Jamaica the working negroes prefer plantains to bread; the former they boil or roast in ashes and eat when quite warm. The ripe fruit when it is yellow and acquired a sweetish flavor is sliced and fried and baked. It has then a pleasant and sweet flavor, slightly acid, and very much resembling baked apples.

12. The bunches of fruit, both in the plantain and the banana, are cut before they are quite ripe, or when the first fruits are beginning to turn yellow. They are then hung up to ripen gradually under cover. There are, however, other methods adopted. The plantains, especially, are sometimes taken from the bunch and packed loosely in a hole in the ground and well covered over. In this way they become softer and have a better appearance than if dried in the sun. When a hole is not available they are placed in a barrel in straw and also covered over.

13. Roast the plantain green, when it becomes dry, and it makes a good substitute for bread; or boiled, to eat with meat instead of potatoes.

14. When ripe roast whole or cut lengthwise into thin slices, fry in butter and eat with a little sugar and cinnamon or wine. By this method it forms a delicious dish for dessert.

15. In Fiji the fruit of the different Musas is variously prepared by the native cooks. Split in half, and sandwiched with grated cocoanut and sugar cane, bananas make a favor-

ite pudding, which, on account of its goodness and rich sauce of cocoanut milk, has found its way even into the kitchens of the white settlers.

16. The Fei, or mountain plantain, beaten into a pulp and diluted with cocoanut milk or water till brought to the consistency of arrowroot, was formerly much used in the Society Islands.

17. I am not aware that the species referred to in No. 16 has ever been imported into Queensland; but the following further method of treating its fruit is given because it may be equally applicable to other species:—A fire is lighted and a bunch of these wild bananas is thrown into it. The outer skin of the fruit becomes blackened and charred, but when it is peeled off with a pointed stick a yellow floury interior is reached, which is most excellent eating and like a mealy potato.

18. In Barbadoes the pulpy stem of bananas is often sliced and given as fodder to cattle.

19. The inner undeveloped leaves when quite white and tender, as well as the flower or scape buds are not infrequently eaten in the West Indies, being prepared for food by boiling; and the head of the flowers of one variety of plantain, in the neighborhood of Calcutta, before the sheaf in which they are enclosed expands, is often cut off, being esteemed a most delicate vegetable. In other parts of India the young flower buds are cooked and eaten in curries.

20. A species of *Musa*—*M. oleracea*—which produces no inflorescence is cultivated on account of its fleshy farinaceous rhizomes which are cooked and eaten.

21. The young stem of the Abyssinnian plantain—*Musa ensete*—is also used as a vegetable; being first of all deprived of all its external envelopes and is then cooked and eaten. Prepared in this way it resembles the cabbage of a palm. This species has been successfully introduced into Queensland, but is not at present available for distribution.

22. In India the central portion of the stem, and the root-stock, are said to be given to cattle to increase the quantity of milk.

23. Baker, in his "Albert Nyanza," says: "Curious as it may appear, although we are in the land of plantains, the ripe

fruit was in the greatest scarcity. The natives invariably eat them unripe, the green fruit when boiled being a fair substitute for potatoes—the ripe plantains were used for brewing plantain cider, but they were never eaten. The method of cider-making was simple. The fruit was buried in a deep hole and covered with straw and earth; at the expiration of about eight days the green plantains thus interred had become ripe; they were then peeled and pulped in a large wooden trough resembling a canoe; this was filled with water, and the pulp, being well-mashed and stirred, it was left to ferment for two days, after which time it was fit to drink.”

24. Ripe bananas mashed and beaten up with milk are a common dish at my own table, resembling—minus the acid flavor the old dish of one's childhood known as “gooseberry-fool.”

25. Stewed with sugar and orange-juice they make a delicious dish.

26. Made into a paste with sugar and spices they make a compact and useful article of food for travelers.

27. At Cayenne and in the Antilles the juice of the stem is fermented and is said to make a good wine, called, *Vino di banana*.

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### HOW TO COLONIZE LADY-BIRDS.

[The following experiences of a fruit grower in California may be of service to coffee planters, who may have had difficulty in colonizing the lady-birds in their groves: Ed.]

Since the discussion regarding the beneficial results obtained by the *rhizobius ventralis* first began the most contrary opinions have been ventilated. The facts as stated by the various gentlemen who had given time and attention to the subject, have appeared to be in conflict with one another, the results obtained in one orchard being different from those obtained in another orchard similarly situated, conditioned and lying, perhaps, closely adjacent. In such case the advantage of the parasite is to some extent, at all events, an open question.

Rowland Machin, ex-president of the Santa Barbara Horti-

cultural Commission, has furnished some interesting data on the matter and, perhaps needless to say, he heartily indorses the utility of the parasite.

"Early in June of this year we erected in various orange orchards tents varying in size from 8x8 feet over the trees, giving ample elbow room inside, made of 2x3 scantling, and 1x3 strips, covered tight with 2½-cent cheese cloth; of course we selected the very blackest scale-covered tree in the block, having due regard to the course of the prevailing winds, draughts, environments, etc. The little beetles were then liberated in varying numbers; under one tent fifty, under another 100, up to 200 in a single tent, taking care to put olive branches—emblems of peace—covered with black scale under the tents, because my supply of parasites was taken from an olive grower in Ventura county, stocked two years ago with only twelve of the *rhizobius ventralis*," writes Mr. Machin.

"Now for the results, and in estimating this, I would say, make haste slowly. Don't do as a certain commissioner in Southern California did with the *novius koebeli* parasite or the pernicious San Jose scale. Having liberated a colony on an infested tree, finding no visible results in three weeks, he sprayed the tree. This week I took my sheet to make an examination of many colonies. In the first tent (whose owner had met me and repeatedly told me he could see nothing of the bugs) I found a nice colony, with specimen beetles just pupated. The second tent (the owner of which declared that there could be nothing left, because he had looked and looked and found nothing) I found gravid beetles and larvæ.

"The third and fourth tent (in spite of the same expressed fears of owners and foremen) the colonies were in a thriving and prosperous condition, and ready to be liberated on the rest of the orchard.

"Now, all these tents had been left intact, and I left them open two feet from the ground, preferring to have them radiate from the lower part of the tent for practical results.

"The rest of the tents had been taken down, where I had put beautiful colonies at the time I put out the others, and do as I would, I failed to find a solitary beetle on any tree near. My conclusions are that the greatest and most

economic success with the parasite will follow colonizing in tents until fairly established in the groves

"In my judgment these colonies now permanently located will, in a year's time, be so plentiful, if undisturbed, as to rid the groves of most of the scale. Unless this is followed to a successful issue, in my opinion, wide-spread disaster will follow in the wake of every citrus grove now affected with black scale."—*Riverside Enterprise*.

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### THE GERMAN EMPIRE.

A very useful service is being rendered by the section of foreign markets in the Department of Agriculture, in issuing bulletins deceptively of The "World's Markets." They are full of instruction for American exporters and of great interest to whoever would know the methods, extent and demands of other markets. Two bulletins have appeared, the first relating to Great Britain and Ireland; the second to the German Empire. The next to appear will be on France and a fourth on Russia. We gather from the latest issue that the German Empire is about one-third larger than California, or rather more than three times the size of Missouri. Prussia is about three times the size of Pennsylvania, and Bavaria a little more than half the size of Michigan or Illinois.

According to the Dictionary of Statistics by Mulhall (edition 1892), the estimated gross earnings of the German people for the year 1889 amounted to \$5,236,000,000, or \$107 per inhabitant in a population of 48,920,000.

The commerce of the Empire is under the administration and guidance of special laws and rules emanating practically the whole of the States of Germany and the Grand Duchy of Luxemburg, for the maintenance of a common tariff or uniform rates of duty on imports from other countries and free trade among themselves.

During the six years ending December 31, 1893, the foreign commerce of Germany increased 8.7 per cent., as compared with an increase of one-tenth of one per cent. in that of Great Britain, a decrease of 3.6 per cent. in that of France during the same period, and an increase of 3.3 per cent. in that of the United States for the six years ending June 30, 1891.

The average imports and exports of Germany for the quinquennial period 1890-1894 in United States money are as follows: Imports, \$1,030,214,000; exports, \$781,658,000; total commerce, \$1,811,872,000.

In the fiscal year 1894-95 the import duties produced 385,757,871 marks, or \$92,816,373, which is 22,645,005 marks, or \$5,389,511, more than in the preceding year, and exceeds the estimates by about 36,000,000 marks, or \$8,500,000. As the tariff has not been raised, the increase shows that the trade is expanding, and that to a certain extent, at least, supplies are nearly exhausted.

Exports to the United States are in an improving condition—since about six months. The United States Consulate in Berlin (from which the district of Dresden has been separated) reports that the exports to the United States from Northern Germany amounted to \$12,909,702 in the first quarter of this year, against \$8,800,854 in the like period of 1894. The consulates at Frankfort and Dresden report an increase of exports to the amount of 9,000,000 marks, or \$2,100,000. According to these reports the exports from Germany to the United States during the first quarter of the current year increased by about 27,000,000 marks, or \$6,400,000, compared with 1894. The increase would be still more considerable, but for the heavy decline of sugar exports.

#### HOW FOREIGN TRADE IS STIMULATED IN GERMANY.

One great factor in the wonderful increase of the foreign trade of Germany is its system of commercial unions. The following is compiled in part from a recent report of the United States consul at Chemnitz, Germany, and in part from the *British Board of Trade Journal*.

The efforts of Germany to secure foreign markets for its products is shown in the great interest taken by it, even to its inland cities. All over the Empire societies are organized to encourage colonization and the export trade of the country and promote practical schemes to fit young men for business, and afterward help them to get places. These unions are agents in helping to extend the foreign markets; they use simple methods which are very successful, and they have

been endorsed by the press, the authorities and the people. They project all kinds of schemes for bringing German products to the notice of foreigners. German emigrants and residents in foreign trade by the receipt of almanacs and other publications containing the names of German firms, with illustrations of their productions and manufacturers.

In connection with the unions are the commercial schools, the strongest of which is that of the Hamburg union for commercial clerks. The union numbers upwards of 42,000 members, has a capital of 125,000 marks, or \$29,750, and has its own schoolrooms, and a fine site near the Hamburg Bourse. During the forty years of its existence it has found places for 40,000 young men. It is the subject of English and French emulation, and is doing a work that deserves the highest praise.

The phenomenal increase in the foreign trade of Germany, from 1,060,000,000 marks, or \$252,230,000, in 1850, to 7,883,000,000, or \$1,876,154,000, in 1894, is due in no small degree to these institutions, and German influence in England, Australia, South America, Mexico, and the United States is also due, in a great degree, to these unions. Kept in constant contact with home by correspondence, emigrating clerks or merchants make themselves agents for the Fatherland, and are ever close to each other by the bonds of such unions, and with their passionate fondness for their mother tongue, unconsciously, it may seem sometimes, but nevertheless with certainty, they find foreign markets for home products and situations for German clerks.

These organizations give out and spread abroad a great deal of knowledge, and, while the placing of clerks is one of their objects, they do not neglect the obtaining of foreign trade. The benefits belonging to such unions are simply incalculable. They give almost irresistible impulses to young men to work their way upward. If German clerks are among the best, hardest working, safest and most reliable, and if German agents are the best informed and most pushing, it is due, in a large degree, to lessons learned in these unions. Their influence, from very modest beginnings, is to-day universal. Organizing in small groups, the unions have gone on growing large in number and powerful in influence

for good. Many of them are rich, with beautiful buildings, fitted up in a simple but artistic manner, pleasing the most æsthetic taste. They have also founded unions in connection with those at home in the United States, Canada, Brazil, Belgium, Bulgaria, Bukowina, Dalmatia, Galicia, Egypt, Denmark, Norway, Sweden, Greece, the islands of the Mediterranean, Great Britain and Ireland, Italy, Sicily, Japan, Luxemburg, Montenegro, Portugal, Roumania, Switzerland, Servia, Spain and Turkey.

Not satisfied to await the necessary slow progress in foreign languages, and ever anxious to extend trade, the German commercial unions have opened in various parts of the Empire bureaus, in which letters, written documents, and printed matter from foreign countries may be translated under absolute secrecy as to their contents. These bureaus are open to everybody. The unions charge members about twelve cents for every fifty words and non-members pay not quite twenty-five cents for every fifty or less number of words.

To illustrate German energy in seeking foreign trade, it is only necessary to take notice that during her strained relations with Russia, Germany beat her record of the year 1893 in drugs, iron, machinery leather, and silk and woollen goods by \$11,424,000, and this was done during a time of business depression when the press was pouring out complaints about the backwardness of business, the stopping of factories, etc., and at a time too when the tariff war was being urged between Russia and Germany.

It was worthy of notice that Russia took from Germany during the early part of 1892 in machinery alone \$21,919,800 worth, against \$20,801,200 worth during the same period of 1891, and this in the face of the fact that Russia's export duties on German goods had gone up 50 per cent., giving the United States, England and Austria a tremendous advantage.

In the last fiscal year the foreign trade of Germany was nearly 16 per cent. greater than that of the United States, and was exceeded only by that of the United Kingdom.—*Am. Grocer.*

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Annual meeting of Planters' Association, Monday, Nov. 25.

### THE COMING PLOW.

[In the September issue of this monthly, an article from the Louisiana Planter was inserted, relative to the need of a new plow to supercede the heavy and unsatisfactory implement which has so long been used from pure necessity. From the latest date received of the same journal, we copy the following description of a newly-patented plow, or more properly machine, which is now being manufactured by the Deere Plow Co. of Moline, Ill. The description is somewhat vague, and even a farmer can hardly gather from it an idea of what it looks like. It certainly is a *machine* of some kind, and if it will only do its work well with less power than is now required, the inventor stands in a fair way of becoming a public benefactor, if not a millionaire.]

"The working parts consist of a standing coulter followed by a concave rolling disk, which is in turn followed by a narrow, pointed iron shoe, which serves to hold the coulter and disk in the ground. The minor parts are a sulky, not unlike those of an ordinary sulky plow, and levers regulating the depth of cut, etc. The disk, which rolls automatically through its contact with the ground, is the principal feature of the machine. Monday we went out to the Ruggles farm and saw Mr. Eno Schomius, tenant there, using it. He was plowing on a piece of oats sods, a portion of the ground being quite sandy, and running from that into a black muck loam, which was quite wet. The first thing to attract notice was the ease with which a medium sized span of mules were drawing the machine when it cut a furrow 14 inches wide and 8 inches deep. With the best of sulky or walking plows the work would be heavy for three horses in that ground. The lightness of draught, as far as our observation goes, is due to the fact that the soil thrown up from the furrow, instead of being forced over a mould-board by friction, and being continually crowded against the unbroken ground in front, is carried around with the revolving disk to the point of discharge, which is a little back of the top centre of the disk; also to the rolling cut of the disk making much lighter work of cutting the land than is necessary in forcing the landside of the ordinary plow through it. Then, again, there

is no landside dragging through the furrow with its great friction to be overcome. The action of the soil upon the disk is such that it continually sharpens the cutting edge and will continue to do so till the metal of the disk is worn away. So the dulled and consequent increased draught of the old system of plows is done away with.

"The machine will cut any width up to 18 inches and any depth to one foot, and may be used for subsoiling if desired. The constant cutting of the disk pulverizes the soil finely and the field is left in as good condition as is gone over with a disk harrow. No plow can turn a nicer furrow. The machine frame sits rather low on the ground and our objection to that would be that it might clog under the beam as all plows do in heavy stalks and weedy ground. The operator told us that Saturday bundles of oats had been thrown in front of it and cut and turned under without the least clog, also that previous trials had shown that it would work in heavy stalk ground where the stalks were broken and left uncut with a view to testing its liability to clog and the conclusion reached that it worked as well over uncut stalks as on smooth ground. But the principle sought in the coming plow does not lie in ease of operation. The hitherto most serious objection to the plow has been its packing of the soil at the bottom of the furrow, something not possible to avoid by any mechanical appliance prior to the invention here alluded to. The downward pressure of the old plows destroyed the natural structure of the soil below the turned furrows. It created a sort of a leaching floor, as it were, by cementing and pressing together the pores before open to air, moisture and root penetration. This scientists and advanced agriculturists knew, but how to overcome it they knew not. The result has been on older grounds, especially those of rolling hills and clay subsoil, a constant washing down of the fertile soil over cemented furrows and the practical ruin of untold acres. In the natural state all arable soils admit air and moisture in a greater or less degree, and anything interfering with these natural conditions lessens their productive capacity.

"Aside from the pressure of the narrow foot the whole width of the furrow instead of being gouged out by a lever

pressing on the soil below is torn out, leaving a mellow, loosened bed of dirt in the furrow below the soil caught and turned by the disk. The plow is not yet on the market, the manufacturers being determined to make it perfect before it is offered for sale, but the principle is there and it is one that those who use plows can not but think well of. Mechanically it seems to work perfectly, yet the experts may find some ways for improving it. The machine, which by courtesy we call a plow, is the embodiment of the first new principle ever applied in this direction—it embodies the difference between pulling the soil out and prying it out. It pulls it out with the disk, which is the vital principle. It is what the alternating sickle bar is to the binder; what the eye in the point of the needle is to the sewing machine; what the filament that breaks the current is to electric lighting. It is the coming plow and our patrons will be interested in it. For this reason we have gone into an extended if not very coherent description of it.”

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### *TEN HYGIENIC COMMANDMENTS.*

1. Any man who does not take time for exercise will probably have to take time to be ill.
2. Body and mind are both gifts, and for the proper use of them our Maker will hold us responsible.
3. Exercise gradually increases the physical powers, which gives more strength to resist sickness.
4. Exercise will do for your body what intellectual training will do for your mind—educate and strengthen it.
5. Plato called a man lame because he exercised the mind while the body was allowed to suffer.
6. A sound body lies in the foundation of all that goes to make life a success. Exercise will help to give it.
7. Exercise will help a young man to lead a chaste life.
8. Varied, light and brisk exercises, next to sleep, will rest the tired brain better than anything else.
9. Metal will rust if not used, and the body will become diseased if not exercised.
10. A man “too busy” to take care of his health is like a workman too busy to sharpen his tools.