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SUGAR.—No change has been reported in the quotations of sugar in New York, to the close of December. The latest quotation for Cuban centrifugals of 96° test being 4½ cts. The unusually large increase in the European beet crop—some 500,000 tons—will all be required to meet the increasing demand in Europe for sugar for food and drinks.

A. D. 1901.

This issue commences a new volume of the PLANTERS' MONTHLY, and every grower or employee of a sugar house should subscribe for it and read each number as it issues from the press. The information given relates mostly to the sugar industry here and abroad; but it would be more valuable, if millmen and others possessed of knowledge gained from long experience or gathered from publications not readily accessible, pertaining to the economical production of cane or from practical work in the sugar house, would contribute such information, or express their own views on the methods now in use—some of which can doubtless be much improved. In many instances, the suggestions of a mechanic, who has had long experience, are of great service, however crudely they may have been expressed, and they may assist materially in developing new processes, the success of which depends on some "missing link," that another writer can furnish as a key to solve the riddle, and bring into service a valuable discovery. Thousands of experiments are at this very moment being made, to improve mechanical work, and out of the many a few may become very valuable.

THRUM'S ANNUAL.—This, the only statistical handbook issued here, has reached its twenty-seventh year, and is as welcome as it is indispensable, even to old residents who have thumbed its pages for the past quarter of a century. The

data given are brought down to the latest date available, and of course cover the past year, as far as obtainable. Five illustrations are given, three of which picture the flower girls and their leis, as seen on the departure of every steamer for San Francisco. No stranger who has ever witnessed the departure of one of these passenger boats will ever forget the occasion. The custom is extending to other ports of the world, but it lacks abroad the enthusiasm which attends it here, where it probably originated, some twenty years ago.

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DR. MAXWELL'S RECEPTION IN QUEENSLAND.

Late arrivals from Brisbane state that Dr. Maxwell had been most cordially received on his arrival in Queensland, and had entered upon his duties—which consist in a thorough reformation of the cane sugar industry of that colony, and of placing it on a paying basis. The colonial parliament had, after some spasmodic attempts to block the measure, passed a liberal appropriation to cover all expense required to place his branch of the public service on a safe working basis. This, however, will probably require a longer period there than it did here, owing to the fact that there are several hundred planters, many of them of limited means, and occupying retired farms, who never saw sugar cane before they ventured in its cultivation in a hap-hazard manner. The average sugar yield among these farmers is said to have been only from one to one and a half tons of sugar per acre.

The Mackay Sugar Journal refers to the doctor's arrival and work as follows: "The arrival of Dr. Maxwell in Queensland is, we trust, the prelude to a very much more scientific and satisfactory management of the sugar industry in this country. To those not engaged in sugar it may seem somewhat strange that an industry should require reformation along lines so broad as to require a highly paid expert, and complete experimental stations, to effect any real good. The sugar industry, however, whether it be in Queensland, or in Europe, in Hawaii or in Louisiana, has certain peculiar characteristics, which cannot be said to equally apply to other industries. The price of the manufactured article is regulated by the world's supply, its cultivation is a highly scientific industry by itself, its manufacture commands the attention of the cleverest engineers, and the most enlightened scientists of the day. Every man, woman and child believes that he or she knows some-

thing about sugar production, and it is only those directly engaged in that industry, and thinking people at that, who realize how much there is to learn and how little the real business in all its branches is thoroughly understood. It cannot be contended that we, in Queensland, are in the forefront, at least so far as the cultivation of the cane is concerned, or indeed so far as scientific agriculture generally is understood. Most of our sugar districts have soils well suited to the growth of cane, and a climate and meteorological conditions that cannot well be surpassed, except in Cuba and possibly Java. Yet we cannot shut our eyes to the fact that we do not, nor have we for many years produced the amount of sugar per acre which is obtained in other less favored countries. What is the reason? Dr. Maxwell has already told us in his clear and convincing report on our industry. What is the remedy? That Dr. Maxwell, when his work is established along the definite scientific lines which alone ensure success, will, we expect, tell us. He comes to Queensland under no delusions as to the task which he has to face. If he ever thought that he would be received with unlimited confidence by every one, the controversies which have raged in the Sugar Journal and other papers over his report will have long since disabused his mind of any such fallacy. But the man who organized the progress of the sugar industry in Hawaii is not likely to allow himself to feel rebuffed in this country. He comes with the full knowledge that before the ink was well dry on his report, the exposures he had made of our mistakes were discounted by the assertions that the facts were all well known before. The remedies were certainly not known, and it is the hope of these that has made the Doctor's welcome to Queensland so general amongst the cane farmers and most of the manufacturers. Spasmodic attempts at improvement have been made from time to time, but it requires the confidence, begotten of having an acknowledged authority as a guide, to make any efforts to advance of real value. And it is here, right on the threshold of the new departure, that all sugar producers and manufacturers, who centre their hopes in the Director of Experiment Stations, must take to heart one great fact. Dr. Maxwell is no magician, who can wave his wand over our industry and restore prosperity to it, bring forty or fifty ton crops, and convert our hundred thousand tons a year into a quarter of a million. He cannot do these things of himself and the success or otherwise of his administration must depend upon the peo-

ple themselves. If they meet him openly, confide to him their difficulties, and then follow his advice, it is perfectly possible that what has been accomplished elsewhere may be accomplished here. On the other hand if the cane growers fail to carry out their part of the contract Dr. Maxwell might just as well have remained in Hawaii. This is the plain fact, and cannot be burked. That the grower will find in the Doctor a friend as well as an adviser we do not doubt, but all the advice is useless, if it is not followed. Of course we shall be prepared to hear that some have not followed his recommendations, and, what is more, do not intend to do so. To such it is probably too late to offer advice, and consolation in their difficulties is of little practical value. They will in the ordinary course of nature continue in their own way, and fail or succeed according to whether they have any knowledge of their own as to the business of carrying on cane-growing. In the meanwhile the great bulk of the cane-growers, and later on a majority of the manufacturers will doubtless come into full sympathy with Dr. Maxwell's efforts and will follow his advice, knowing full well that he will not advise them to do impossibilities, but will feel it his duty to only recommend a course of action which he has made it his business to know can be followed. No immediate improvement on a large scale can be looked for. The work of the next two years must be largely experimental and preparatory. The improved conditions of the industry will then gradually come about, and it remains for those engaged in the sugar production to see that nothing they do, or leave undone, is calculated to hamper that desirable consummation. * * *

Parliament has practically disposed of the two bills, dealing with the Sugar Works Guarantee Act and the Sugar Experiment Stations, to the satisfaction of the sugar producers. * ' * It has authorized a further capital expenditure of £150,000, which will be used in further strengthening the present factories, and in the erection of two new ones. The second measure is the useful one dealing with the establishment of sugar experiment stations. In this connection there is nothing really to add, except to congratulate the Government on having secured the passage of a bill, which, while it safeguards the rights of the State, as to the controlling and money-finding power, gives the head of the experiment stations a really free hand, and leaves him unhampered to pur-

sue his course of work, as seems best to him. * * * The sugar industry is, we believe, about to enter upon a more enlightened course of expansion, and it would be a thousand pities if the unsought interference of politicians retarded or nullified that progress. The recent debates in Parliament lead us to hope that this fact is being recognized in those political circles where hitherto it has been ignored.

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U. S. DEPARTMENT OF AGRICULTURE.

Secretary Wilson, in his annual report to the present Congress, makes a complimentary reference to the work of his predecessors which has brought the Department of Agriculture to its present state of efficiency. He declares his aim to be to bring the Department scientists to the help of the producers, to ascertain what we import that they can produce, with a view to encouraging its growth; to search the world for grains, fruits, grasses, and legumes, that they may be domesticated here and be an improvement on what we have; to secure new and improved varieties of plants by cross-fertilization; to co-operate with the experiment stations in all the States and Territories in research of practical value to the people of all sections; and to seek out new markets for our surplus products.

Mr. Wilson emphasizes the manner in which this Department differs from others. He says its appropriations should be regarded as an investment, for the reason that it makes direct returns therefor by adding to the wealth of the country, thus adding yearly largely to the profits of the farmers and others as the result of its investigations. He instances as money-saving or money-making agencies the Weather Bureau; the meat inspection; the pathological investigations of plant; the services of the Entomologist; the services of the Department on behalf of the sugar and tea industries, of the orange industry, which owes its beginning and its preservation to this Department, of the tobacco industry, and others.

Then taking up the work of the Department in more detail, he reviews the operations of its several branches.

Regarding the Bureau of Animal Industry, he reports that the number of abattoirs and packing-houses receiving the benefit of inspection was 148 in 45 localities, as against 138 in 41 localities the preceding year. The total ante-mortem inspec-

tions of cattle aggregated 53,087,994; animals rejected, subject to post-mortem, at abattoirs, 5,958; and in stock yards, 153,561. The total post-mortem inspections were 34,737,613, and the total carcasses condemned, 61,906. In the microscopic inspection of pork 999,554 carcasses were examined. Of these but 19,448, or 1.95 per cent., were found to contain living trichinae. The total cost of inspection was but a few dollars over \$700,000. Of vessels inspected by officers of the Bureau, 862 received clearances. Of the cattle shipped across the Atlantic, the loss amounted to but .24 per cent.; of sheep, .71 per cent., and of horse, 2.55 per cent. It is interesting to note the increase in the number of horses exported. Of these, over 29,000 were landed from American ports at London, Liverpool, and Glasgow.

During the quarantine season of 1899 over a million cattle were moved under the supervision of the Bureau from the district infected with the Southern cattle tick. In Texas alone, over 357,000 cattle were inspected for shipment to other sections. The sheep industry has suffered from sheep scab, and much time and attention have been given to securing its control and eradication. Experimental shipments of dairy products are still continued, and shipments of butter have been extended to Cuba and Porto Rico. The Department is seeking to obtain information useful to butter exporters in canning butter and producing butter especially adapted to shipment to warm countries. Some countries sending butter to these markets show a disposition to adapt their products to the needs of those countries, which is an example our producers must follow if they are to compete successfully with them. The Secretary earnestly recommends an inspection of dairy products designed for export. He points out the example of other countries, whose large foreign trade in dairy products has been principally developed, owing to the fact that their best products bear a Government stamp guaranteeing the article to be as represented.

In the division of chemistry, elaborate work in the investigation of food adulteration has been continued. Over 500 samples of preserved meats of all kinds, purchased in open market, have been examined. The meat of the horse has been examined for the discovery of a method whereby it may be detected when sold under another name. Very little of it seems to be sold in the United States, whether under its own name or any other name. Active co-operation has been had

with other bodies, notably the Pure Food Congress, in an effort to secure legislation on the subject of food adulterations. National legislation on the subject is urged as essential to supplement and make efficient the work done in several States. The sugar-beet work has been prosecuted with vigor and intelligence. Foreign food products introduced into this country have been the subject of careful study. The results are confidential, and are only used for the information of the authorities of this country controlling imported food products.

Most satisfactory reports are received from California as to the result of the entomological work in the introduction of the insect which fertilizes the Smyrna fig. In one locality more than six tons of Smyrna figs have been produced. The result will be to make America, in the near future, a grand competitor in the fig trade of the world's markets. An important parasite has been introduced to prey upon the olive scale, so injurious to the olive growers of California. From Natal a fungous disease has been introduced by which injurious swarms of locusts have been destroyed. Efforts have been made to introduce European parasites of the gypsy moth.

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*PROF. STUBBS' DESCRIPTION OF CANE PLANTING IN
HAWAII.*

(Continued from December No., Page 548.)

Referring to the cane grown on the windward side of Oahu, Mr. Crozier asked: What is the difference; how do the figures compare on the other side?

Prof. Stubbs: The yield is smaller; they are small, but the profits are large because the expenses are not so heavy. They get, say, from two to four tons of sugar per acre on the rainy side, which are considered fairly good crops. On the leeward side the yield is large, and the average is high—between five and eight tons.

Col. Zenor: What distance are these two points apart—the leeward and the windward on the different islands?

Prof. Stubbs: On the island on which these figures were given it is eight miles across.

Col. Zenor: Have you any reason to give for this wonderful difference, for this wonderful condition of the elements on one side.

Prof. Stubbs: Yes, because of the mountains intervening

being from six to fourteen thousand feet high, they rob the northeast trades, which are blowing all the time, of all the moisture, precipitating it on the windward side; and when they reach the leeward side they are exhausted of moisture. You can sit in the hotel at Honolulu and look on the mountains and see it raining nearly all the time; and yet at Honolulu there is never a drop. I mean practically none.

Col. Zenor: How deep did you say they furrow; how deep do they plant their cane?

Prof. Stubbs: As I told Mr. Crozier I have a picture of a man standing in one of the furrows which I will show with the stereopticon; and you will get a good idea from that. They go down about 32 inches. They plow deeper than we do, and they furrow deeper. They are economizing water by it; they are doing everything they can to keep the water from evaporating. Water is the greatest cost. \$64 for water and fertilizer.

Chair: How many years do they keep the stubble?

Prof. Stubbs: Not more than one year; and only about one-third of the plant is in stubble. That is one of the secrets I found out over there. They don't believe in stubble. They never keep a stubble crop that will give under thirty tons; and on most of the plantations I visited only one-third of the plant was in stubble, and only first year's. Their stubble don't pay.

Col. Zenor: It has not paid very well here.

Prof. Stubbs: They use a cane called Lahaina. We have a specimen of it at the Park, which with us comes up late in the spring, and it does not stubble well. It is in a patch with one hundred and odd varieties and you can go there and pick it out very readily on account of there being no stand in the stubble, and yet all around it you will find good stands from the other varieties. I would also say to you that about five years ago I sent some of our striped cane over there, and they have been growing it ever since. This summer they took the first crop off for the mill. I saw some of it over there. You never saw such a magnificent growth; it's just spreading itself. They got 17 41-100 tons of sugar this year from that cane, and it is destined in my opinion to be the coming cane. You saw an account of it in the Planter. Dr. Maxwell wrote me the results and I published them in the Planter.

Before leaving this subject—if there are any other questions to be asked about Hawaii—I would like to say, Mr. President,

that the question tonight, which is the best method of preparing our soil—I don't believe we have attained this yet.

Chair: After studying the conditions over there in the islands I would ask you to state what you saw there which you think would be applicable to Louisiana soil and the Louisiana climate.

Prof. Stubbs: My own impression is that we have got to imitate, to some extent, the present practices of Hawaii. I listened to the Colonel's paper there with a great deal of interest. I am certain, as he says there, that that method is the universal practice in Louisiana. But is it best? I am satisfied that that method is certainly apparently an economical one; but what we are after in preparing the soil is to place it in such condition that the tilth can be obtained so that during the subsequent year the largest amount of plant food can be supplied to the plant. I am satisfied that method will not accomplish it. This is based not only on what I saw in the Hawaiian Islands, but also from our own practices during the last three or four years. It has been our habit for the past several years to flush or broadcast our land. We split out the middle of the old rows, as the Colonel has said, with a double mould board plow, and after breaking out the middles we run a disc plow and thoroughly break that land broadcast. For the last three years we have been using the disc plow, breaking ten inches deep, and we cut fifteen inches wide. As soon as the land is flushed and in condition to disintegrate we take the two horse plow and put in a row. Our success with this method, both in large crops and in economy of labor, was very satisfactory by using the disc plow. Although the pea vines are sometimes waist high, yet the driver never gets down from the plow; whereas in using the turn plow, especially in stiff lands, it is frequently the case that the driver has to get down to get loose from the vines and in this way loses a great deal of time in a day. With the disc plow you don't have any trouble in getting around the field. One day we tried an experiment to see how much we could run in a day; and between 6 o'clock in the morning and sundown we plowed three acres with three mules and a disc plow. We plowed ten inches deep and made a cut of fifteen inches.

Col. Zenor: That was plowing solid?

Prof. Stubbs: Flushing. Now we can take a two-horse plow and bed an acre of that easily afterwards. If you will count the cost I think you will accomplish cheaper work that

way than you would by ridging in the manner Col. Zenor says.

Col. Zenor: Better. Absolutely better. The economy is greater, too.

Prof. Stubbs: In other words you have worked more acres and have done it a great deal better. We have left not a single particle unbroken, and we have prepared the land thoroughly. Now throw your land into ridges in the fall of the year, opening your middles well, clean out the quarter drains, having your ditches well open to receive the water from your quarter drains and you will find the lands in excellent tilth next spring. Preserve that tilth; do not throw the bed down as soon as the spring rains come—let the spring rains get in; and if you off-bar, off-bar in ridges; maintain your ridge during the whole summer. You will find your land, if you maintain your tilth during the year, will give you much better crops. I really believe that by the proper preparation of the land and subsequent proper cultivation there will be an increase of ten tons to the acre in this state, and I think without boasting that we have demonstrated it at the station. Talking about your low yields of both tonnage and sugar content; we have a field of cane up at the station prepared in the manner described. It has been cultivated exclusively with cultivators, there have been no plows in it; and I am almost willing to guarantee thirty-five tons, covering first and second years' stubble and plant! and one piece of stubble went through the freeze. From our experience up at the experiment station I believe we are justified in making that prediction. The first stubble polarized 13.3 to 13.9; today, I am satisfied it is due entirely to the thorough preparation of the soil and the subsequent cultivation. It has been done so cheaply that I am almost ashamed to tell what it has cost. There was no hoe used, except to scrape the plant cane. We used cultivators early in the season—from early May until early in July, without cessation. During the rainy season, when we found the grasses getting troublesome, we took one of the disc cultivators and set it so as to cut about a half inch right into the middles and we killed every crop of grass during the rains; and then, when the weather permitted, we put the cultivators in and split out the middles; and I don't think we gave them more than three or four cultivations during the year. It is absolutely essential to put the land in first

class tilth by the method of breaking it and preparing it properly; and afterwards maintain that tilth.

Col. Zenor: Don't you attribute a good deal of the results to the good conditions prevailing and to the results of your tile-drainage?

Prof. Stubbs: No, sir; on the contrary, I have had unfortunate results with my tiles. Every time we have one of these heavy rains, the water backs up in the canal, it covers the tile and checks the water, depositing a very heavy amount of silt in them. There is not sufficient force in the water to wash it out. We have dug the tiles up in places several times and have found a very fine clay which lodges in the tiles which seems to absolutely wedge itself in.

Col. Zenor: I believe Captain Pharr's tile drains have given him a great deal of trouble on that account.

Prof. Stubbs: I am very certain it comes from the fact that we have no proper outlet.

Prof. Stubbs: I want to say further that I found it absolutely necessary, in order to make a good crop next year, to begin breaking in the fall of the year—putting the land in good condition as I said just now; ridging it before the winter comes on so that it will take the winter rains. So thoroughly convinced I am of this that I have every acre at the station prepared that way except those now in cane and cotton I cannot now reach—I have them all ridged up for planting next spring. I believe the one success in this country is to prepare the land thoroughly in the fall—plow thoroughly, ridge up and turn it well to put it in proper condition, and let nature bring it into good condition of tilth.

There is one other point not germane to this subject that I would like to mention. I have had quite a number of visitors during the past few weeks, and I have investigated the question of fall planting. All of them told me they use from three and one-half to four running stalks in planting. I want to remark upon the absolute waste of cane in such methods. Last year I gave a great many planters the No. 74 seedling, they planted in one stalk continuously. I have visited a good many places this year and they have a beautiful stand from just one stalk. Now, they all say this was due to the cane, to the peculiar variety. But I say no; it is due to the excellent manner of the soil. Now, let us carry the point I am making a little further and see what it is costing the state of Louisiana—we will probably plant 200,000 acres of cane this fall

and next spring. Four stalks—running stalks—amount to eight tons of cane to the acre; three means six tons; two means four and one means two tons. Now, if we all plant four running stalks on the 200,000 acres, it means 1,600,000 tons of cane, and that, at \$5.00 per ton, is simply \$8,000,000, which is twice the loss we should sustain. Now, I have urged that we do, in Louisiana, as they do everywhere else—use the tops; they are objectionable in our sugar house; they contain no available sugar, but are responsible for much of the molasses which enters into our pan and causes a great deal of evaporation. If we adopt this economical method, taking say the upper one-third of our cane, and plant it, and send the lower two-thirds to the sugar house, we will make largely increased amounts of sugar at reduced cost; and we will have in addition seed costing practically nothing save the labor of handling it. We are now, as near as I can judge, saving one-fifth of the crop of Louisiana for seed. Then we could have the entire crop, which would probably have from fifteen to twenty per cent more sugar in it, using the lower three-quarters of the stalk for the sugar house and the upper fourth or third for planting; and we have profits at both ends—saving the enormous amount of four or five millions of dollars worth of seed every year. How you are to do this, I cannot answer, since many planters say they can't get enough labor to harvest the crop and therefore cannot save tops. I am happy to say that several planters are trying it, saving and using the tops. I earnestly believe that, by the proper preparation of the soil, by the subsequent proper cultivation and fertilization and dispensing with our hoe gangs (for there is no necessity for them if the crop be properly worked), that we could increase the yield in the state of Louisiana eight or ten tons per acre, and at the same time save probably from five to ten millions of dollars per year in our present expenses. These are pretty harsh statements, Mr. President, but I believe them to be true.

Col. Zenor: We will come to them when we come into competition with those islands.

Prof. Stubbs: We are coming into competition with them right now. Hawaii is here beyond a shadow of doubt; Porto Rico has sent a delegate to our congress and the Philippines will send one as soon as peace is restored. I think Cuba will be ours beyond a shadow of doubt. If we do, we shall have

tropical islands enough to grow the sugar of the world inside of the United States.

Chair: Before you sit down, Professor, I would like to ask you if you think it possible for us to grow sugar at the figure that it costs to grow it over there?

Prof. Stubbs: No, sir; I do not, for the reason that, in the United States, labor is higher than in the island. I had a letter today from a Jamaica planter who wrote me about this very subject we are discussing tonight. He stated he was low employing labor, digging holes along his stubble and burying the trash, putting it under the earth, he said, for from six to eight pence per day—that was what he paid for doing it in Jamaica. I wrote him a long letter today, four or five pages, in which I detailed a good deal of what I said tonight.

Chair: What was the effect of annexation in the Hawaiian Islands?

Prof. Stubbs: It has disturbed it very much, as you will see by the letter I read a few moments ago. Before annexation they had contract labor. I have brought back with me one of the contracts, more as a curiosity, which is written in Japanese and in English. It is signed by the Japanese consul, who is located in Honolulu and is also signed by the Commissioner of Agriculture for the islands. The contract binds the laborer to the planter for a term of three years and it likewise binds the planter to observe his contract. If in time the laborer jumps his contract, under the laws then existing in the Hawaiian Islands he was sent back to his work. On the other hand, if the planter did not pay up, judgment was rendered against him at once, and the laborer got his pay. In other words, it was a cast iron contract. In the annexation act of the United States, contract labor was abrogated at once; in other words, it dissolved all contracts existing in the Hawaiian Islands. Ever since then, the Japanese and Chinese have been moving to the city. They are independent and at perfect liberty to go wherever they please; they can jump the plantations and go off. They now have agents in this city and in Mississippi, in Porto Rico and elsewhere in the world, hunting laborers. It is a very serious question with them over there.

Chair: Will that have any tendency to bring the rates of labor higher in the United States?

Prof. Stubbs: I think it will, in a few years. You will see from this letter I received that they have raised the figures

25 per cent. There they have 25,000 Japanese and about the same number of Chinese. Most of these have work. They will work better and cheaper than any other. The Chinese are the best workers in the world. Everybody is hunting him and everybody is praising him. One of the bankers in the Hawaiian Islands remarked that he would rather loan a Chinaman money on a simple I. O. U. than to lend it to an American on good security.

Mr. Crozier: You spoke of the manual and physical application on this work in the field—these industries being controlled by stock companies, don't they also have additional expense for salaries of presidents and secretaries?

Prof. Stubbs: No, sir; they pay a certain commission to these general agents in Honolulu, three per cent on all they buy and three per cent on all they sell; just like our brokers charge for buying and selling. That is the universal practice, and they are growing rich at that.

Mr. Crozier: How about the general manager?

Prof. Stubbs: Oh, yes, this general manager is paid; but this is included in the expenses—every expense is included in the account.

Col. Zenor: A great deal of sugar is sold here for one per cent.

Prof. Stubbs: Yes, but these merchants handle the entire crop and ship it to market. I may also make a remark which will be of interest to you. The planters in the Hawaiian Islands have just renewed another contract with the American Sugar Refining Company under which they will sell their crop for the next three years to the American Sugar Refining Company, delivered in San Francisco at one-half a cent below the price in New York. That is the contract just entered into for 96 centrifugals. They make only 96. You may remember, under our reciprocity treaty they could not make refined sugar; that is they could manufacture it but they were prohibited from bringing it into the United States; hence they are not now making refined sugars; it is all 96 centrifugal; and they are to get the price of sugar in New York on the day of arrival in San Francisco, less one-half a cent a pound. That is the contract they have for the next three years.

Chair: That is made individually with the different companies?

Prof. Stubbs: Yes, sir; or made through the general agents of the plantations on the island.

Col. Zenor: The planters are not so favorably impressed in regard to the United States legislation concerning contract labor?

Prof. Stubbs: No, I don't think so, if you will allow me to let a little politics enter here. I think the planters are a little disappointed over the annexation, anyhow. Previously they enjoyed certain advantages under the reciprocity treaty which they no longer enjoy. They get all their coal from Australia; formerly it came in free; but now they have to pay a duty of 66 cents a ton; they have to pay a duty on the beeves they import; a duty of two cents a pound on the sheep from Australia. Before they were in a very desirable position; they had all the rights and privileges of America, and yet, at the same time, of all other countries and they had none of the United States duties to pay—at the same time they enjoyed the protection afforded them by the United States. But there is one thing that has been accomplished; annexation has increased the value of property; it is worth much more on account of the stability of government.

Col. Zenor: Our only hope then to get any relief is that their supply of water will give out. (Laughter.)

Prof. Stubbs: It is just this; they have every available acre in cultivation now that they can get.

Chair: We don't see any chance of making them take water.—Louisiana Planter.

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AGRICULTURAL PRIZE PAPERS.—CANE TRASH.

The Colonial Sugar Refining Company made a departure this year in connection with the Cairns Annual Show by offering a first prize of £3 3s, and a second of £2 2s for the best set of answers to a series of ten questions relating to the cultivation of sugar cane. These prizes were offered through Dr. Reed, manager of Hambledon plantation, with the result that there were eight competitors. Mr. Brooks, overseer in charge of Kamerunga State Nursery, and Mr. Clark, cultivation overseer of Hambledon, were appointed by the show committee to act as judges. The answers were sent in under a "nom-de-plume," proper name and address being enclosed in a sealed envelope, not opened until after the prizes were awarded. Bona fide farmers only were allowed to compete. Mr. Thomas Binnie, cane-farmer, Hambledon (under the "nom-de-plume" of "Humus") secured first honors with 72 marks out of a pos-

sible 100; Mr. C. R. Spencer, Aloomba, annexing second prize with 70 marks. We append Mr. Binnie's answers, and while doing so take the liberty of recommending our farmers to give the matter careful study.

QUESTIONS AND ANSWERS.

1. Why should cane trash not be burnt off but returned to the soil?

Answer.—As trash contains over 50 per cent of the plant life taken from the ground, this is completely lost by burning; and by plowing it in, this amount of humus or plant food remains to feed future crops. Fire frees a large quantity of nitrogen, which is one of the principal agents in plant growth, so that by burning we allow this to escape into the air, and it is lost. In heavier soils the burying of trash has the further advantage of loosening the soil and allowing the atmosphere to penetrate and sweeten it.

2. Why should green manure crops be plowed into the soil before planting the cane?

Answer.—The advantages of green leguminous crops are: 1st. They draw atmospheric nitrogen and store it. 2nd. They send down roots into the subsoil, loosen and obtain potash from it. 3rd. They generally enrich the soil with vegetable matter or humus, thus supplying plant food and enabling the land to retain moisture.

3. Why are artificial manures used in cane cultivation?

Answer.—Fream in his elements of agriculture says: "Though a soil may contain an abundance of the constituents of plant food, it is only those that are dissolved in water that can permeate through the plant and aid in feeding it. The object of the cultivator in his treatment of the soil by tilling, manuring and fallowing is to provide a succession of available plant food so that as the nitrogen, phosphorous, potash, lime, and all other matters existing in the soluble form are used up, fresh supplies may be ready to take their place." And in order to do this properly we have to consider that as the digestive organs are to animal life, so are rootlets to cane growth, and in order to render this growth healthy it is necessary to feed these rootlets with an easily digested food, and as they can only feed on substances dissolved by water we supply them with artificial manures which chemistry and experience teach us (with due regard to climatic and soil conditions) will assist to dissolve those substances and will supply the necessary food our soils have been denuded of and are

naturally deficient in, and which are soluble by a minimum of water.

4. Which are the best kinds of artificial manures for plant and ratoon cane respectively?

Answer.—The artificial manure most suitable for plant and ratoon crops in this district is yet in doubt, but from my experience I am of opinion that meat works manure is an exceedingly profitable manure. I think good results are to be obtained by giving the land a top dressing of lime just before planting as lime naturally works its way down through the soil, and dusting from five to six hundredweight of meat works manure per acre into the plant drills. Any manure containing blood refuse, soda, nitrogen (ammonia, etc.), potash and lime in reasonable quantities must be of advantage to either plant or ratoon cane.

5. Why is it inadvisable as a rule to take more than three crops from one planting?

Answer.—As it is necessary for good cultivation to break up the soil to the air, and to sweeten the refuse from preceding crops by exposure to the action of the atmosphere, and it being impossible to do this thoroughly in ratooning it is necessary to plow out to prevent the land from becoming sour and exhausted. Cane from its nature makes its best growth from new stems or suckers each year, and as these naturally make out for fresh soil, it follows that with the continual forcing of the growth back by ratooning on to the parent set or plant the produce must degenerate. All canes are surface feeders and continual ratooning leaves the cane on high ridges, and makes it impossible to supply the ratoons with proper nourishment. If the soil is not well worked, grubs and other vermin as well as disease to cane are likely to be encouraged.

6. What is the object of scarifying between young canerows?

Answer.—The principal objects in scarifying between the rows are: 1st. To keep the ground in good tilth. 2nd. In dry weather to form a dust blanket on the soil, thus lessening evaporation, retain as much moisture in the land as possible to assist in dissolving the plant food. 3rd. To keep down weeds which would either choke the plants, rob them of moisture, or cause heavy expense in getting rid of them by hand labor.

7. State opinion for and against top and bottom trashing.

Answer.—In my opinion it is of the greatest advantage to the farmer to trash his cane when it has grown to a length of from two to three feet, as by so doing you let air and light into the cane, both of which are conducive to growth, you allow the young suckers to come away and make cane, and prevent water in the wet season from lodging around the cane inside the leaves, causing it either to throw out lootlets from the joints or to shoot from the eyes. This trashing also leaves a protection on the ground for the cane when it falls over, and by keeping it off the damp ground prevents it from rooting where it touches the soil; it cheapens the top trashing required just before harvesting, and prevents loss of breaking, and finally assists and cheapens cutting, as if done properly, and the trash cleared well away from the stools, the cutter gets a clean blow at the roots of the cane, and thus does away with the evil of cutting high, and leaves him no excuse for not cutting below the ground. The great advantage of a top trashing or stripping if done about a fortnight before harvesting, are that it enables the cane by exposure to the air to ripen up, it allows the cutter to top off the stick close to the green top, and enables the farmer to give satisfaction at the mill by not sending green unripened cane. This year I have tried an experiment in two trashings as against one. In one field I trashed early in April at a cost of 7s per acre. I left one acre untrashed. This week I have stripped the field at a cost of 6s 6d per acre, and put two boys on to the acre untrashed. It has taken them four days to do the work, which at 6s per day means 24s per acre for one trashing as against 13s 6d for the two.

8. Why should cane stalks be cut below the surface of the ground when harvesting?

Answer.—Cane stalks should be cut below the surface of the ground, because if stumps are left above the ground, the eyes or buds near the surface sprout quickly, and rob those lower down and then die off in great numbers, while those left develop into thin whipsticks; whereas if the stalks are cut well under the surface, the strong buds or suckers below that, having a good hold of the ground, will come up strong and healthy, and form stools for themselves, thus making heavy ratoons.

9. Which month is the best for planting cane in this district—and give reasons?

Answer.—A great deal depends on the season as to which

is the best month to plant cane, but taking the average season, in my opinion, April and May are the best. My reasons are—This being the end of the wet season the ground is naturally full of moisture, and the cold we have here, while it may check the upward growth, assists the young plant to gain a good hold of the ground and stool out, so that when the natural heat draws the cane upwards, having plenty of roots out to supply nourishment, good growth goes on all through the spring and summer. The cane is thus ready for a bottom trashing in February or March, and is well ripened up during any time in the following cutting season. Cane planted in April or May can, owing to the dry season which usually follows, be more easily kept free from weeds which of course means cheapness, and by the time the wet season comes on cane so planted should have covered the ground and be out of hand and ready for the bottom trashing, which can be done more cheaply in the wet and gives employment to your labor which cannot profitably be employed weeding, etc., at this season of the year. Many favor planting earlier in the season, but I do not agree with them for the following reasons: You will have to do your plowing in the wet, and land plowed in heavy wet is like working up a mud pie, when dry weather comes it bakes like a brick. In heavy wet, weeds in this climate grow faster than the cane and as they have to be kept down the working between the rows adds greatly to the expense, does not kill the weeds, puddles your ground and does away with the good effects of your previous cultivation. I have always noticed that cane planted early shoots up quickly, and is from two to three feet high when the cold weather checks the growth which does not start in the cane again till the thunderstorms in November and December, and also that at all the joints that have grown before the check there are rootlets; the cane gets thin where checked, and when vigorous growth sets in is not strong enough to support the heavy cane above, and the result is you have crooked cane lying in all directions more difficult to trash and cut than the later planted cane, and as a rule do not gain much weight although the cane is older. The leaves of cane planted in April or May are well over the ground by the hot weather of October and November, and protect the roots and young shoots from the fierce rays of our tropical sun.

10.—What is the latest month from the farmer's point of

view for cutting cane, with due consideration for next ratoon crop? Give reasons.

Answer.—From a farmer's point of view all cane should be cut before the end of November so that his work, ratooning, etc., should be done and the ratoons be well away before the heavy rains of January have soddened the ground, and also to enable him to have taken advantage of the dry spells between thunderstorms (which usually occur in November and December) to keep his scarifier going to keep down weeds and sweeten the ground between the rows.—Queensland Sugar Journal.

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COST OF REFINING SUGAR.

The very strong competition which exists between the New York sugar refiners, is forcing them to reduce the cost to the very lowest point possible. Notwithstanding the very large capital that is invested in the business, and the close competition between the rival companies, liberal annual dividends of from seven to twelve per cent are said to be paid to those interested in the various enterprises. Late advices state that a new refinery is now being erected in Philadelphia, to cost over one million dollars, which would indicate that the parties interested are confident of success, either in carrying on a separate refinery or in forcing the old ones to buy out the new rival. The New York Journal of Commerce publishes the following statement, which probably gives the facts as nearly as they can be ascertained; though some of the large refineries doubtless turn out sugar at a less cost:

In his testimony before the Industrial Commission Mr. Havemeyer pointed out that the cost of refining is not the same as the margin between 96 degrees raw sugar and granulated. The commercial value of a degree of sugar is 6 cents per 100 pounds, so that from the margin 24 cents per 100 pounds must be deducted. "There has never been any cost of refining that I have ever been acquainted with less than one-half cent a pound," said Mr. Havemeyer. When the margin is only 50 cents per 100 pounds it is a "fair inference" that refineries are running at a loss. Dividends could hardly be paid from profits resulting from such margins, but Mr. Havemeyer refused to state the source from which his company paid at that time 12 per cent dividends, when the margin was below 50 cents. With the margin at 75 cents "it is beneficial, and there is no great damage done then, but not unless everything

is working in concentrated form and in the very best manner. Mr. James Post submitted to the Commission an estimate, prepared by the general manager of the National Sugar Refining Company. It shows that the cost of refining, including the revenue tax of 4.799 cents per 100 pounds, amounts to about 35 cents, while the loss of weight in refining amounts to 28 cents; total, 63 cents, as the necessary margin. The cost has not substantially changed within five years. Large refineries, such as those of Havemeyer & Elder, with 12,000 barrels capacity, and Spreckels, with 8,000, could probably produce at from 3 to 5 cents less.

The movement of refined sugar is puzzling. It was generally supposed that the various interests worked together, but the irregularity of the market would seem to indicate that some of the independent companies meant to get all the business they could within reach. Regarding the situation, Willett & Gray's Statistical says:

"The Arbucksles seem to be free lances and determined to run full and sell all they make, regardless of consequences to both their sugar and coffee trade. This tendency to monopolize as large a position of the trade in dull time as in the active season may bring about a demoralized state of the roasted coffee market as well as of the refined sugar market if it goes much further. Thus far, the grasping of the demand has been met only by the National and McCahan companies, but it is a matter of time only when the American Sugar Refining Company may be expected to make a move also, either by another cut in coffee, or in sugar, or in both coffee and sugar. Certainly a crisis is at hand which can only be averted in one way, and if not averted, trade in sugar and coffee may have sensational moves in the coming six months."

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The weather throughout these islands has been unusually fine for the winter season, and very favorable to the growing cane crops. The only drawback has been a lack of labor in each stage of field and mill work. Under favorable conditions of both rain and labor, the crop which will be harvested this year ought to exceed three hundred thousand tons, which was the estimate for last year's crop. Three plantations—Waialua, Makaweli and Olaa—are expected to raise the total yield this year above that of the previous year, but to what extent cannot yet be safely estimated.

THE CANE BORER IN LOUISIANA AND HAWAII.

At recent sessions of the Louisiana Sugar Planters' Association, the ravages of the cane borer have attracted much attention. It would appear from various reports that this pest has been on the increase lately, not only there but in other cane growing countries. It is one of the enemies of sugar cane, which rapidly increase unless combatted with constant vigilance. What the best method to pursue to accomplish this will probably vary in different countries and climates, but whatever plan is adopted, it will require the utmost vigilance and perseverance to reduce the damage caused by them, as they increase with extraordinary rapidity where no efforts are made to destroy them.

In the convention referred to Mr. Henry McCall said: "Mr. Chairman, and other members of the association are aware, of the destructive operations of the insect known as the "cane borer" that has done very considerable damage in the parishes of Ascension, certain portions of Iberville, certain portion of West Baton Rouge, and certain portions of Assumption and Lafourche; and it may be other parishes. I only mention those parishes I happen to know something about. * * * We have never had anything like it at all. We have always had a certain amount of borers; but this year on our place and one or two places in our neighborhood you could hardly find a stalk of cane not bored more or less; some were terribly bored; and worse than that we find them in our seed cane. Prof. Stubbs seemed to think, or rather implied in a letter to me, that when the cane was put under ground that the borer would soon disappear. Perhaps he will, in the course of time; but seed cane which has been down a couple of months ago still contains plenty of live borers; we find them alive in the tops of cane."

Mr. Richard McCall confirmed the statements of the previous speaker and said: "The cane is alive with borers; the tops are full of borers. I don't know whether to burn or not; whether to keep it in the row or put it on top of the row. The borers are alive in the tops; if we burn these tops. If we can dry these tops thoroughly, and we believe we could—Prof. Stubbs can tell us whether if we do not burn at once they will deposit eggs which will become butterflies. These are facts which we want to know."

After further discussion the following preamble and resolution were passed:

"Whereas, The parasitical insect known as the cane borer has done incalculable injury to the cane in many sections of the state, making the stalks dry, hard and light, materially reducing tonnage and sugar contents; therefore be it

"Resolved, That Prof. Stubbs and Prof. Morgan be and are hereby requested to make such investigations, entomological or otherwise, as may indicate why the borer has been so plentiful this season and what remedies can be applied to its complete or partial destruction."

The same pests have been in our island cane fields for many years past, and generally are more numerous in wet lowlands than in the drier and more elevated fields. In the *Planters' Monthly* for the year 1883, we find the following reference to the borers:

"When it first became known in these islands, many years ago, various means were tried to protect the cane from its ravages. Perhaps at no place were they more destructive than in the valley of Hanalei on Kauai, during the first few years after the Princeville sugar plantation was started. Mr. John Low, when manager of that plantation (about 1880) used every method of cultivation which ingenuity could suggest, to destroy the pest, and the plan which he finally adopted has been generally considered the best way to prevent damage from it. That was to give the land a most thorough cultivation, stripping the cane early and often, keeping the stalk free from loose leaves and rubbish, and burning off the fields after the cane was cut and removed. The burning being sometimes repeated. The eggs of the insect are supposed to develop best under leaves which cling closely to the stock, and which are allowed to remain long. At one time it was feared that the borer would become a most serious obstacle in the way of sugar culture in these islands, but by improved cultivation, careful stripping and thorough burning, it has so far proved to be of but little damage, especially in places where the trade winds blow."

In another volume of this publication, a planter reports: "We all prefer the tops, either of plant cane or ratoons for seed; but plantations infested with borers should be very cautious about using this seed. Where the borer exists in the cane, it is full grown in the body of the cane, and can be easily detected and thrown out of the seed; but in the top we

find the egg laid by the borer beetle or the minute borer just beginning its course—both too small to be discovered without very careful observation—certainly too small for the workmen to see as they handle the seed. Hence the borer is more likely to be propagated by planting the tops of cane than by planting the body of the cane.”

Mr. Lowrie, when manager of the Ewa plantation on Oahu, reported having borers in one field only in 1897 or 1898, and by thoroughly burning the field, he got rid of them. He thought that burning was the most effectual remedy that can be found, but the work should be done immediately after harvesting, and done thoroughly; but to do this well, required dry weather, the burning to be followed by deep plowing.

One planter suggests that dipping the cane seed in weak lime water kills the eggs and young borers while it does not injure the seed, if planted immediately after the dipping. Other mild washes used for immersing the seed cane may prove equally effective in killing both the borers and their eggs. Probably the most effective remedy against these pests is intensive cultivation of the soil, causing rapid growth of the plant, though even this has not always proved successful.

In Prof. Koebel's report to the Hawaiian Agricultural Association, in November 1896, we find the following of interest in this connection:

Compared with the cane fields visited in the Fiji Islands and Australia, I am glad to say that these islands are most fortunate in the few plant diseases and insect pests affecting the sugar cane. The effective and rigorous modes of extermination against them leave hardly anything to be desired.

THE CANE BORER—*Sphenophorus Obscurus*.

This may be classed as the most injurious enemy of the sugar cane present on these islands. Its ravages will exceed those of all other insects combined. Its attacks on the sugar cane, however, seems confined to the more damp localities, whilst in drier places such as Lahaina the borer is hardly noticed. I have been informed that the Lihue Plantation has recently suffered severely from the attacks of the borer. Not only sugar cane is damaged by this insect, but many other plants are damaged by it, chiefly the bananas and cocoanuts. A grove of the latter was shown me in Hilo, in 1894, that was badly infested by the beetles. Setting fire to the dry leaves was recommended; this was done and the plants have since entirely recovered. Dying cocoanut palms were examined and

in the tender heart of the palm was found great numbers of the insects, in all stages.

To my knowledge this beetle is not present in the cane fields of Australia; there the larva of a *Nonagria* moth is very destructive to the cane. It is only a question of time when the borer will be present there also, as it is very numerous on Fiji Islands. During my visit there in 1892 Governor Thurston informed me that soon after the cultivation of cane was commenced and coolie labor from India was introduced, a disease appeared upon the banana plants that later spread over all the islands, destroying both the cultivated and wild varieties of the plant. I attributed this destruction entirely to the attacks of the sphenophorus beetle, as this could be found in large quantities, breeding both in the tops of the bananas and in the tubers below ground, causing the same effect upon them as upon cane plants in these islands. The latter when planted from seed injured by the borer, producing only dwarfed bushy plants; the same effect was noticed in the banana plants. During my stay at the Nausory Mills in Fiji, various methods were tried to mitigate the ravages of the borer, which at that time was so numerous that fully 50 per cent. of the cane coming to the mill was affected, in addition to this, large quantities of cane were utterly destroyed, and left in the field. Nothing more effective was found than the simple plan of catching the mature beetles by placing pieces of split cane, one foot in length, flat side downward, about 10 feet apart in places most affected by the beetle; during the night the beetles congregate under the pieces of cane to feed upon the juice, and are collected in the morning by children, who are paid a small sum per pint of the beetles. Enormous quantities were caught in this manner, and the result in two years was most gratifying, the borers were nearly got rid of at a very reasonable cost, less than two per cent. of the canes showing any sign of the borer.

The effective remedy in use here, burning off the trash as soon as possible after the cane is cut, is not resorted to in Australia, hence the enormous increase of fungi and insect pests.

Mr. Geo. H. Fairchild, manager of the Makee Plantation on Kauai, informed me that on his arrival at that place, the fields were swarming with the borer, yet by burning the trash twice, in the field and collecting what remained and burning the same under the boilers, an almost entire exemption from

the attacks of the borer was obtained. Such results are gratifying and the plan should be followed wherever it is practicable.

It appears that the beetle, as a rule starts its work in young cane fields, first along stone fences where such exist; here they find protection from the sun and from fire during the time of burning the trash. Collecting the beetles by children, as is done in Fiji, would doubtless be of great benefit and comparatively inexpensive.

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The dawn of the new century is for America the opening of a new era of industrial enterprise. The nineteenth century saw the development of our resources; the twentieth century presents the problem of finding remunerative employment and business opportunities for the ever increasing numbers of young men who are each year crowding into the industrial army. We will find it in the superiority of our goods, in the enterprise of our merchants, in the wise statesmanship of Seward, which ran our Pacific Coast boundary from the Mexican line to the Arctic Circle; in the providences of war, which have dotted with coaling stations the Pacific Ocean to our empire at the door of the Orient, and will make the Pacific an American lake; in the providence which has given us Porto Rico, which will make Cuba ask for entrance into our Union, and enable us to dominate the Gulf of Mexico, the Caribbean Sea, and the isthmian canal. These are not dreams; they are the processes which have made New York City the metropolis of the continent, and will make it the financial center of the world.—Chauncey M. Depew.

At the fiftieth annual convention of the German Sugar Manufacturers, held at Madgeburg in October, Dr. Paasche presented a report upon the conditions of the sugar industry in this country and in Cuba, the result of his observations during a recent visit, made solely for the purpose of ascertaining if dangers threatened the German sugar industry there. He said in substance that if Cuba regains its normal productiveness, or still worse, if it doubles its production as some fear, the magnitude of the disaster which will result in the world's markets cannot be over-estimated.—Louisiana Sugar Planter.

THE LOUISIANA SUGAR CROP.—The grinding season is fast drawing to a close and while there are occasional instances noted where satisfactory results have been obtained both in tonnage per acre and in yield per ton, there is nevertheless a great deal of disappointment on the majority of the plantations as the cane has been far below expectations in weight, although there have latterly been more or less satisfactory results obtained in the sugar house. The weather during the entire campaign has been excellent and the expenses of grinding have consequently been much less than usual which is an extremely fortunate circumstance, and which may, in a small measure, compensate for the scant tonnage secured. Such perfect grinding weather has seldom been enjoyed.—Louisiana Sugar Planter.

In a very strong article condemning forest fires, Prof. Watts of Jamaica says: There is one point which I have left till last, because of its importance; I refer to the indiscriminate burning of pastures. If this continues as in the past the work of establishing trees will be rendered extremely difficult; these pasture fires, sweeping over the country destroy young seedling trees by hundreds, they injure and destroy those trees which may have succeeded in making a little growth, and, year by year undo all that nature is striving to do towards the clothing of our hillsides with desirable timber. Something must be done to check or to limit this. Some of this burning of pastures is done deliberately and for definite reasons; most of it, however, is the result of carelessness and thoughtlessness. Where the burning is done intentionally it usually has for its object the removal of the old coarse dry grass in order to produce a fresh growth upon which cattle will feed, or it is intended to destroy ticks. With regard to the custom of burning to produce a fresh growth of grass, I am strongly of opinion that the process is a destructive one in the long run.

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*PROF. HARRISON'S EXPERIMENTS WITH SEEDLING
CANES.*

When a representative of the Chronicle called at the Government Laboratory, Professor Harrison and his staff were surrounded by pieces of sugar cane which were being put through a miniature mill. The canes, which were cut to one

size and carefully classified, were those selected for testing purposes in connection with the seedling cane experiments. As the canes were only now coming in, Professor Harrison said, it was too soon to give an idea as to how they will compare with the Bourbon this season. "Each year," he added, "we are raising large numbers of new seedling varieties and they are subjected to exhaustive tests so that now with our extended experience we rule out canes at once as not worth troubling about which ten years ago we should probably have considered excellent and deserving further cultivation. The result is that every year we have to take a higher standard from our comparisons. So far as we have gone there are varieties that promise to compare favorably with the standard Bourbon variety, but it is impossible at the present stage to state that any one variety will do better than the Bourbon, although there is every indication that such a cane will be obtained in the near future." So far as the experimenters can tell at the present time, some of the old seedling canes are the best, and Nos. 109 and 78 have been the most successful. With reference to Barbados 147, the variety to which Dr. Morris directed the Secretary of State's attention some months ago, Professor Harrison said it had not shown any special promise in this colony, although he regarded it as a fairly good cane.

"As we extended the cultivation," Mr. Harrison proceeded, "we found that several canes that we expected good results from failed to fulfill their promise, notably No. 74. That cane was first grown here, but its general results were not sufficiently satisfactory to warrant its retention among the experimental canes. Yet it is reported to be doing exceedingly well in Louisiana where the climate and soil evidently suit it."

As evidence of the care that is taken in selecting only the best varieties of canes for experiments, Prof. Harrison pointed out that up to February last 4,401 different kinds of seedlings had been examined, and of these only 47 had been selected as worthy of further consideration. With the addition of the piece of land attached to the Orphan Asylum to the experimental ground at the Botanic Gardens an opportunity has been given to Messrs. Harrison and Jenman of giving the most promising canes a fair test. At the Orphan Asylum ground the pick of the seedling canes cultivated between 1890-97 are being cultivated and the progress of the experiment is being closely watched by the planters, many of whom

have visited the ground. "We know the quality of the seedlings as shown in previous years at the Botanic Gardens," said Professor Harrison, "but now that we are working on a larger scale we do not know whether previous returns will be maintained. The plants, however, will be distributed among those planters who wish them."

In reply to a question as to whether local planters were paying much attention to the experiments Professor Harrison replied in a most decided affirmative. The planters here, he said, were a cautious lot and when their neighbors in Barbados and other West Indian Islands discarded the Bourbon cane on account of the rind fungus they persevered here and got rid of the disease. According to Mr. Harrison the situation was aptly expressed at the last West Indian Conference under the auspices of the Imperial Department of Agriculture. Some representative had spoken of the good results obtained in this colony from the Bourbon cane as compared with other places, and Dr. Morris was reported to have remarked: "The Lord has been peculiarly kind to Demerara." To this Mr. Harrison's reply was "Is there any other planter who deserves the Lord to be so kind to him?"

Professor Harrison said that local planters were now showing a great interest in the seedling cane cultivation experiments. The great majority of estates, he added, "had now some seedlings planted but the managers went quietly about their work, and while one expressed a preference for a certain variety another preferred some other sort. In this way it was difficult to get at what was proving the most successful plant. At Plantation Diamond, however, where there was "an immense area under experimental cane cultivation," there would this season be the biggest experiment conducted under absolutely accurate conditions. Prof. Harrison would not commit himself to any statement as to the area under experimental cane cultivation, but he suggested that roughly 1,000 acres of seedling canes would be cut this season. Besides the authorities of Plantation Diamond, the New Colonial Company, Limited, the Vriesland Sugar Estates Company, Limited, and others are going in for experimental cane cultivation on a fairly large scale, and it is hoped that the more extended scale of operations will be rewarded by more definite results than have been obtained hitherto, as the experiments are being conducted on a strictly scientific basis and every attention is being paid to accuracy of detail. "Of course,"

Mr. Harrison added, "it may take two or three years yet before we get reliable returns which would justify planters in replacing the Bourbon with other varieties. I have heard of astonishing results from some places, but I do not pay attention to such rumors. It will be an affair of years before we supercede the Bourbon."

As showing the rigid process by which all seedlings which could not be counted as first-class were discarded, Prof. Harrison mentioned that in 1898 out of 700 varieties selected for analysis only 22 were passed as of the first standard, and in 1889 only five could be really included among the first-class. The points considered are the size of the canes, the percentage of juice, and the proportion of sugar contained. Latterly the purity is also being taken into account.

Mr. Harrison had a word to say about the returns of the seedling canes here as compared with those in the islands. In Barbados and Trinidad, he remarked, the standard of quality was lower than here. Some of the canes spoken of highly in these islands had been discarded here, and what might be regarded as a promising seedling in Barbados would not be regarded as of any account here. In that island they replaced the Bourbon by other canes which would not come up to the same standard and consequently their seedlings might show a higher return in comparison with the canes cultivated than the seedlings did in this colony when compared with the Bourbon.

In concluding Professor Harrison said that while the local planters were extremely cautious in adopting anything new, they were manifesting keen interest in the experiments which were being conducted at the Botanic Gardens, apart from those which they were carrying out themselves.—Demerara Chronicle.

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 THE TROPICS AND WHITE MEN.

At the Roman Catholic Church congress held in Sydney in September, a paper was read by Dr. Ahearne, of Townsville, on the above subject. The paper, which is printed in full in the "Freeman's Journal," a copy of which has courteously been sent to us, is most interesting reading, and from the sugar point of view not the least valuable are the following extracts which we make:

"No one will spend time profitably here who does not accept

without faltering the truism that God rules the universe. "And God said let there be lights in the firmament, to divide the day from the night, and let there be signs, and for seasons and for days and years." "And let them be for lights in the firmament of the heaven to give light upon the earth; and it was so." And it is so—because, fortunately, man is powerless to amend the movements of the sun and moon. He made man, and "sent him forth from the Garden of Eden to till the ground from whence he was taken." What was his intention? St. Paul tells us in his Athenian speech, "He hath made of one blood all nations of men for to dwell upon all the face of the earth and hath determined the time before appointed and the bounds of their habitation." Being an intelligent God, He equipped man so that he should be suitable to his environment. Accordingly, He designed that men should vary in color and shades of temperament to fitly occupy the multiple regions of the globe. This map shows the earth's surface between the tropical lines, Cancer and Capricorn, the belt known to everyone as the Tropics. It includes Siam, Borneo, Java, Hindostan, Mid-Africa, West Indies, the Panama Isthmus, and the Cannibal Islands. It almost needs an apology to tell you that the inhabitants of these countries are black. We have here inside this area also the Northern part of Queensland jutting into the Arafura Sea, close neighbor to New Guinea, on the level of Fiji. The aboriginal owners are black, very black, but a white race is meantime in occupation; it is of this people I would speak. Are they in the "bounds of their habitation"? If not, what penalties are they paying for stepping over Nature's boundary? I propose to deal with the inexorable exactions under three heads. Well, then, the white race in North Queensland is undergoing modification physically, mentally, and morally. Physically, in a decided narrowing of chest capacity, and of the trunk generally; in less decided though definite tendency to disproportionate elongation.

I may be permitted to use an extract from a paper I read before the Australasian Association for the Advancement of Science. It is a comparison of measurements between boys on the North Queensland coast and boys of similar ages in England. According to McLaren's tables the average girth of chest of boys in England at 10 years is 25 $\frac{1}{4}$ in., 11 26 $\frac{1}{4}$ in., 12 27 $\frac{1}{2}$ in., 13 28 $\frac{3}{4}$ in., 14 29 $\frac{1}{2}$ in., 15 30 $\frac{3}{4}$ in. In North Queensland, from information supplied me by the head teachers of schools.

the average girth at 10 years is 24 in., 11 24 $\frac{1}{2}$ in., 12 25 $\frac{1}{2}$ in., 13 26 in., 14 27 in., 15 28 in. The usual exception turned up in a healthy place called Bowen, where a boy of 14 measured 31 $\frac{1}{4}$ around the chest.

So much for the width. Now for the height. When the arms are placed horizontally during moderate expiration the circumference immediately under the nipples and the angles of the shoulderblade should be equal to half the length of the body. However, in North Queensland I find that the mean length of the bodies of fifty-eight boys exceeds the mean circumference of their chests by 1 15-16 in.—that is to say, in North Queensland a boy is two inches taller than he ought to be. What of that? Ah! In these days of scientific economy it is hydraulic waste. It is pumping a column of fluid 2 in. higher than was normally intended, 75 times per minute for every 24 hours year after year, until the pump is prematurely worn out, if accident does not throw it violently out of gear.

And what is the effect of a narrow chest? A narrow chest means limited lung space. It is easy to conceive this, if one remembers that Nature does not exert herself unnecessarily in any direction. A large share in the elimination from the body of its burnt-up material is carried on through the skin and the lungs. In a cold climate the skin or the lungs is obviously very moderately used, as compared with the performance demanded of it in the tropics; hence in a cold climate the lungs are called upon to be ventilators and energetic eliminators of noxious gases. The continued automatic action enlarges the chest space of the growing child, which, of course, remains capacious when the adult framework is completed, provided disease does not interfere. On the other hand, when the skin acts perspiringly, and to all intents continuously, such lung space is not needed and the chest proportion must essentially be moderate.

This must affect an individual's suitability for cosmopolitan residence and occupation. While the Englishman is furnished to undergo the trials of the tropics, the tropical white native is not framed for residence in the harsher countries. Indeed, in the latitudes he has made his own, the tropical resident of some years' standing possesses less endurance than his fellow-workman imported from a more bracing locality.

I remember making an official visit to report on the sanitary state of a camp in the neighborhood of a big engineering work which was being carried out by Southern contractors.

One of the firm told me he had employed local men at the beginning of operations, and for a time, a short time only, matters progressed with satisfaction. The work was hard, and gradually, one after the other, the hands retired, admitting they needed a spell. Substitutes from the Southern colonies were brought to fill their place. This was not a question of wages. It was simply a case of getting work done in a certain time, and local men, I was assured, failed to support the necessary strain.

This experience can be reasonably believed from what I have said. When the lungs are freely used quick oxygenation is proceeding, tissue change is accomplished rapidly, and good red blood courses speedily through the channels of the system. The elongation, the length without proportionate width, weakens the back; the spine is indifferently buttressed; it gives curves. This is, perhaps, more the case amongst girls who have not the same amount of athletic exercise as boys. So, with weaker body muscles to sustain them, girls relieve the vertebral weight imposed on its pelvic base by instinctively stooping, crouching forward, making a concavity of the chest, which of itself is predisposed to become hollow. Of course, this injury is fostered by the senseless parents who put their children's feet in shoes; and, later, the girl exaggerates her deformity when she struts the pavement in the high-heeled shoe of the French coquette. Unattractive, ugly, is this gait which silly woman voluntarily assumes. The poor Chinese female has to submit to the severe distortion of her feet, although the infant voice pityingly protests with rending cries against the cruelty. After all, it is only the feet that are squeezed out of shape in China; but your girls, your sisters, your wives throw the body out of its natural axis, and so dispose it to a train of bad consequences. Thus it is quite plain to understand how and why the Registrar-General of Queensland, in his vital statistics for 1898, has the melancholy statement to report: "By far the most fatal (cause of death) to childlife was enteritis; the next was premature birth." He remarks: "This is more properly speaking the cause of death rather than disease."

Give me the carriage of the aboriginal woman, who, shoeless in every land, fulfills the familiar words of the nature-loving old poet, "Vera incessu patuit dea." This amendment of the framework with its reduction in space is of more serious

import to the female than to the stronger sex. The vital redness of the blood depends primarily on the supply of oxygen, so that diminished lung area, which is air surface, means impairment of blood—in popular language, thinness of blood. Our women therefore are pale, and suffer exhaustion from the demands upon their vital energy. And it requires no argument, surely statement is enough to gain your adhesion to the proposition, that a woman to be a mother should not be anaemic, listless, jaded, offering, as somebody has neatly said before me, the silent plea of a spiritless non possumus. People, who in the South complain of the enervation induced by the oppressiveness of the two or three days that precede your southerly buster, may try to imagine weeks, months of such weather. Sick women lie sweltering in hot beds, pale children make ghastly attempts at play, men expose their perspiring chests to feel the air they make by their own motion; for often no movement is in the atmosphere itself dense with moisture that one may almost collect between the palms; this atmosphere rests provokingly, while the great sun shines drowsily through the haze with a smile of a conscious power directed to those helpless against his mood. For seven months in the year, on the coast, this is the true condition every day until the breeze reaches the shore during the southeast monsoons; and it is true of all day and all night, when the winds come from the north and the rainy season is established.

Is this fair field for motherhood, for most of our mothers are good natural women, who nourish their babies to their own injury, risking, I might almost say forfeiting, thereby any attractive freshness they might have had; an attractiveness which it is the lot of their more-favored dusky sisters in the same latitudes to possess and retain for a span?

The children, however, who live, thrive in their first years until the influence of climate overcomes that of race.

To minimize the glare, and with instinct to protect the eyes from the fierce rays of light, we get face and forehead wrinkles, making the young look old and knowing.

We get freckles, which are merely pigmentary changes; some more, some less, according to the degree of exposure and individual susceptibility. But individual susceptibility may be considered a minor factor only, for all skins change to the exposure, and all parts—the bared arms of the bushman, the uncovered legs of the beachcomber—strain under the influ-

ence of the tropical sun. I firmly believe that the coastal inhabitants, if fenced off from benefiting by the introduction of fresh material, would darken in color, or die out. That is a suggestion which I do not present as a sensational random opinion, and I offer you in support a few comprehensive sentences that tell very much in its favor.

Sir Joseph Fayrer, Bart., K.C.S.I., M.D., F.R.S., has spent the greater part of his honorable life in distinguished service in India. On the 30th of May of this present year he delivered to the Balneological and Climatological Society an address in which he states, "Past history shows, however, that colonization by the unmixed European races in the plains of India is impracticable. In the very rare instances in which the third generation has been reached it had evidently attained its utmost desirable limits, whilst to the Portuguese who preceded us no descendant unalloyed by native blood can be said to exist."

India lies between the eighth and thirty-fifth parallels of North latitude; North Queensland lies between 10 degrees and 31 degrees—30 South. There may be a special intervention of Providence to favor the white North Queenslander. I doubt it.

The everlasting sun's heat makes people selfish, les fainantes aiment leurs aises. In the tropics man to be a nice man should sit down under a shady tree all day and eat fruit.

Contrast the pleasant, good tempered Hawaiian lover of flowers dilettante consumer of vegetables, with the Dyak of Borneo, who nervously rushes through life hunting for heads; or the equable Kanaka of the New Hebrides with the restless Solomon Islander who raids his neighbor to devour his flesh.

It is apparent—the stern, rapacious eagerness in these men-eaters, these tropical beef-eaters.

Good fighters. Yes! cruel, quick, full of nerves. So if we want endurance we must have beef. I borrow to say the pale clerk who eats meat twice a day will outfight and outstarve the burly agricultural laborer whose big thews and sinews are mostly compounded of potatoes, corn, and water. And as our climate resents activity, we eat much beef to yield energy and defy climate. We eat beef very young and we get energy—nerve energy—and so we go to school early, very early, voluntarily. Our children love school with an unnatural liking—it is morbid.

Thus we enter on the anxieties of life prematurely. What for? Education.

But is it good education her daughter has had, when the best of English mothers tells one "the girls won't do anything at home; I have to cook and clean the brass work or it would not be done well, if at all"; when an exemplary Irish widow declares of her girls "the natives are too lazy to work?" On the other hand, it is too much trouble for the relaxed parents to exact obedience. With the school anxiety and the sacrifice of muscle and mind we tire young.

The shopman is slow to serve, does not think of suggesting alternative purchases, or recommending what you don't want—he wishes you hadn't come in; he longs for you to be done. In fact, acuteness of early wear and tear weakens the nerve cells. Mind impressions are not distinctly stamped—receptivity is not assured. To draw a parallel. When one touches an electric button, if the battery is well charged and the connections be well insulated, the click of the record is sharp and the indications definite. If the battery fluid be weak, or the insulator imperfect, or the disc-hinge slack, you do not wonder to have a blurred register.

But while admitting we are "not too good" in the present dreadful idiomatic vogue, all Australia in fact might be a lot worse, notwithstanding the critical chastisement of a candid visitor and the admonitions of a prophet in our own country. No need to be hysterical, for I read from the Registrar-General of Queensland that while in New South Wales the rate of illegitimacy was above that in Queensland, on the other hand the ratio for South Australia was remarkably low.

The figures are:—Queensland, 6.04; New South Wales, 6.93; South Australia, 3.62. But, further, I think it is as well we should know from the same source that "although the present rate of illegitimacy is in excess of what formerly obtained, it still compares well with most European countries." According to Mulhall some of them are as follows:—England, 5.4; Germany, 8.7; France, 7.4; Sweden, 10.2; Austria, 13.5. I have been speaking particularly about the coast country.

On the Tableland, however, the conditions are better. Although we have a few exceptional elevations they are not used as in India for hill stations. These Fayerer describes as "resorts in which the European may preserve his health and avoid the deterioration which inevitably results from protracted residence in the plains, where, indeed, it seems even pos-

sible that he may take root, thrive, and propagate his race, and for which there are grounds for belief that the prospects of success are not altogether unfavorable, though so far no conclusive proof is forthcoming." Our Herberton district is high, about 3000 feet; there we have broad-chested, rosy-cheeked children, and the langour of women in a great measure disappears. The interior averages perhaps only 100 feet above sea level. It is even now obvious to the open-eyed observer that the stalwart pioneers who drove the first cattle and sheep on to the unsettled north country are being succeeded by slimmer types of men. And now, if I have made plain my own belief that white people in the tropics are beyond "the bounds of their habitations," I trust I have in a measure succeeded in justifying that belief. If so, I submit that it is a subject claiming consideration at this unique gathering, destined by force of circumstances to be historical upon whose proceedings the intellectual eyes of our Empire are, beyond doubt, with more than ordinary interest at the moment turned.

It is well if it can be established in the minds of the dwellers in temperate Australia that the conditions of life and climate in tropical Queensland are special. It will be well if those facts, those local conditions, be recognized and remembered by the legislator of the Commonwealth, who will serve the best interests of his country by preserving the humility becoming to ignorance in matters affecting purely tropical questions, if he be pardonably egotistical on all others.

It should be the prayer of all of us that the gentlemen soon to be commissioned by the Southern constituencies will be temperate in their meddling with tropical affairs, where experiment and crude theory can be practised without endangering a national industry by ill-timed radical disturbance. I do not wish to touch on anything political. It is an economic question of deep universal concern to the whole Australian nation, the question of how work is to be done in the tropical plains and jungles, and that question will no doubt be raised in the Federal Parliament. It merely occurred to me to make use of my little effort before you in attempting to draw a moral, as it were—a common-sense moral. And my excuse is the sad experience we were once forced to go through in North Queensland. We suffered a set back that generations will not overtake, when a zealous but unpractical politician

encouraged the insensate demand of a thoughtless democracy and raised himself to power with the cry of "No colored labor in the cane brakes—perish the sugar industry, rather."

It was not the intention, I know, to degrade the white man. Sir Samuel Griffith has been always influenced, I believe, by the sincerest motives, but poor fallible man seizes an hypothesis which suits his mental state at the moment, and hurries untimely, without ascertaining whether it is really proved or not.

So, in a period, the Henry George period, of revolutionary dementia, an edict went forth from the workingman's Codlin that the harmless South Sea Islander, the only servile laborer employed up to the time, must cease to come to the sugar plantations of Queensland. The worried planter, already feeling the effect of the rival beet sugar that was increasing annually on the Continent, sought in every corner and by every means to prevent the strangulation of his industry. Every port, from the Congo Mouth by Zanzibar to the extremities of the Malay Peninsula, sent us colored riff-raff, and Oriental scoundrels crowded in by every steamer.

Thus was precipitated the foundation of undesirable piebald population it was the hope of Sir Samuel Griffith to prevent. Then shortly the truth of nature asserted itself, and facts spoke out; and Sir Samuel Griffith, discomfited, was brave enough to admit his error by performing a more complete somersault than any Parliamentary acrobat I have knowledge of.

If I have been gloomy, I have been truthful, and I have been truthful because you in the South ought to know us as we are, for shall we not soon have common interests? At the beginning of the new century we shall be merged in a definite nationality, the parts that are scattered entities now to be bound by close ties of sentiment, and the closer ties of business.—Sydney Paper.

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TREE PLANTING AND FORESTRY IN THE WEST INDIES.

The following extracts from a paper prepared by the Hon. Francis Watts, British Agricultural Chemist in Antigua, W. I., will be of general interest here at the present time:

"Even with the uncertainty as to the effect of forests in

general on rainfall I think we are safe in concluding that, under the conditions prevailing, an increase of timber in large clumps or masses and of such a quality as to produce a fair amount of shade, would have a marked effect upon the moisture of the air and that we should see these woods acting as 'condensators of vapor' as Dr. Schlich phrases it, thus performing a duty which we greatly need. During hot dry weather we frequently observe light showers begin over the sea to windward of the island; as these showers approach the shore they become lighter, frequently ceasing as they pass over the heated land; now it seems more than probable that a well-timbered area, owing to its being cooler than untimbered land, would lead to condensation taking place, and a cool shower taking place precisely at a time when showers are most urgently needed. On the whole we may expect that an increase of trees would lead, directly or indirectly, to an increase of moisture.

"But not only is the amount of moisture falling as rain to be considered, the influence of the forest or woodland is far more marked in its effect on the distribution of the water after it has fallen; in the first place the evaporation is diminished so that the soil remains moister, but another and greater effect is observed; most of the rain falling upon a bare slope or upon a pasture rushes rapidly into the drains and water-courses, comparatively little soaking into the soil if the fall is very heavy; after the first inch or so has fallen the amount soaking in steadily diminishes, so that a point is reached when practically all that falls subsequently runs away without benefiting the soil, indeed on the contrary, often damaging it by washing away the surface mould. But when rain falls upon a tree-covered area its force is broken, it meets with various obstacles retarding its rapid rush over the surface of the ground, while the surface of the ground acts as a huge sponge, retaining much of the water, from the presence of a covering layer of dead leaves and small undergrowth. The layer of leaf-mould found in some woods is capable of holding water equal to a rainfall of upwards of five inches. It is this feature of wooded districts which leads to the existence of streams in wooded valleys, these streams as a rule do not flow from springs in the ordinary sense of the word, but are fed from the water retained by the covering of leaves and small undergrowth. We have an instance of this in the

streams at Fig Tree Hill and Christian Valley. If once the trees in these neighborhoods were cleared these streams would quickly disappear. Conversely we may picture to ourselves what the condition of the island would be were the hills adequately clothed with timber, so that each valley had its perpetual stream; what a relief from our water famines this would constitute, to what increase of fertility would it lead and how beautiful would become many districts which are now little better than arid wastes.

"Under existing circumstances many of our hills, instead of forming natural reservoirs of water, feeding the streams refreshing the land, now constitute sources of loss; the rain falling upon bare slopes, or upon slopes covered with but a scanty covering of grass, rushes away without hindrance, carrying with it any loose soil. There are formed temporary large and wild streams which do considerable damage and are productive of little good, sudden in their rise and equally sudden in their fall they are of little value as sources of water, though usually in the larger streams there are small ponds and water-holes filled with water of bad quality. Nearly every one of these streams marks the course of what, under favorable conditions, might be a constant wholesome rivulet.

"By retarding the flow of water over the land, woods and forests preserve the soil from wasteful washes and prevent the formation of dangerous gullies. This danger from the formation of gullies is not so prominently brought to our notice in Antigua, where the soil on the slopes is of no great depth, while in the lower lands it is stiff and tenacious. In some countries large tracts of country are actually devastated by gullies, which often begin as unnoticed little washes in abandoned fields or in places where timber has been felled and the land left bare.

"Belts of timber constitute valuable agencies in sheltering tracts of land from hot drying winds. In this island there are many places which suffer extremely from a small rainfall accentuated by high winds, which speedily cause the evaporation of the small amount of moisture in the soil. The difference between the amount of evaporation in a still atmosphere and in a breeze is enormous, no one knows better than a planter the drying effect of a high wind. If the tops of some of our low hills were covered with timber it is reasonable to suppose that the climate on the leeward side would be im-

proved and the fertility of the soil perceptibly increased. In these islands, where the prevailing winds are constant in direction, more advantage may be expected from the sheltering action of masses of trees.

"Some forms of wood, if properly cared for, might form welcome shelter for cattle, while producing a certain amount of grazing.

"With an increase of timber an increase of birds may be expected.

"While touching upon this aspect of the influence of woods, the question of the influence they may have upon two of our pests may be thought of: I refer to the mongoose and to ticks. I fear the former will find shelter, but I do not believe it will be more favorably sheltered by properly grown, shady woods than it is by the low scrubby bush now existing and which I think could be replaced to advantage by shade-giving trees; if this is so I do not think any disastrous increase of mongoose is to be feared; so far as I am aware, it is not the real forest areas which encourage mongoose but rather the low dry scrub, possibly the moisture of dense woods would not prove congenial. With regard to ticks, it would seem reasonable to suppose that they are encouraged quite as much by the thin scrub as they would be by well grown, shade-giving woods.

"These are some of the effects of woods and forests, but there is a direct effect which should not be lost sight of, they should afford a source of income to the estate on which they are situated. I fear we are too disposed to regard trees as accidents of nature to think much of wood as a means of revenue in Antigua, but the idea is worth dwelling upon. After a wood reaches a certain age a fixed proportion of the trees may be cut annually, it is a crop to be harvested and the harvesting should be done systematically: after the cane crop is reaped comes a time when work for laborers is scarce, there is little to be done until the work of preparing the land for the next crop commences; this is a period in which the care of the woodlands would afford occupation for some of the best of the laborers. I may suggest a few ways in which a regularly grown and regularly harvested wood may provide useful material, both for the estate and for the community generally. Wood for building estate carts, not only wheels but all parts, may be obtained, so may posts and rails for

fencing, while a regular supply of hard-wood for house construction would be a boon. One sometimes finds an old house in some country place, which has stood long and whose floors and roof have remained in spite of neglect; if any enquiry is made one is almost certain to learn that its timbers are of native hard-wood, and to hear it regretted that such it not procurable now. It might have been procurable if our predecessors had cared for our woods. Wood for staves of casks, barrels and hogsheads, wood for boat building, for furniture and for firewood, while if considerable quantities of wood are regularly cut and harvested the best pieces may be set apart and occasional shipments made. With a more abundant supply of wood and the selection of durable kinds, improvements should result in our houses and in our estates' buildings generally.

"This aspect of the wood as a crop to be harvested is one I would commend to your attention; it is true that years must pass before such a condition can be arrived at; we are suffering from want of forethought on the part of those who went before us, but this cannot be regarded as a valid excuse for doing nothing to improve matters; it will require little expenditure in the way of effort and less in the way of money to start a movement for re-stocking the waste places of the island with trees, which in a few years will be useful in ameliorating the climate, in conserving moisture and restoring our streams, in providing a revenue, which if not extensive will at least recoup any actual expenditure which may be made, while some additional labor will be provided for our work people of several classes.

"Now it is well known that the sugar planter does not like trees, and from his point of view I am disposed to agree with him, for he is usually thinking of solitary or scattered trees near his cane fields: these are a source of trouble to him and are probably of little use. What we want are large clumps of trees, acre upon acre in size, if we can get them, then we can afford to get rid of some of the trees which our friends often tell us regretfully are much in their way; however, until we can be assured that a movement for re-afforesting our waste lands is established, and in actual, rapid progress, let us do our best to preserve every tree we can.

"If we take a glance at the conditions prevailing in Antigua we shall find that the hills extending from about Blubber Valley to English Harbor have at one time or another, with

very little exception, been denuded, they are now covered with thin timber and scrub with large open spaces of grass. The heaviest timber exists about Orange Valley, Christian Valley, and from Bott's mountain to the neighborhood of Fig Tree Hill and Claremont. When we pass to the limestone hills running from Hope's Head through Parkham to Collins, Montpelier and Freetown, we find them covered for the most part with lob scrub with few shade-giving trees, a few loblolly trees are to be seen, but no trees of any size, such as it is conceivable once existed, and should exist again. Then there are acres of lowland with here and there slight elevations, barren and treeless, covered with indifferent grass and affording but poor pasturage, in some cases this is covered with thin troublesome acacia scrub which affords little shade and few of the advantages which would follow from the presence of shade-giving trees. If those who are in charge of these lands are convinced that the establishment of trees on some of these areas is really desirable, then I believe the trees will be found there before many years are over. That is where the movement has to begin; if those who have the care of these places want trees they will secure them; if they do not want them, no amount of talk, discussion, legislation or Departments of Agriculture will succeed in putting them there. I therefore beg you, who are thus responsible, to give the matter your consideration and make up your minds whether we are to have trees or no."

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NEW VARIETIES OF CANE.

In their scepticism regarding the reported very high qualities possessed by the B 147 cane, so much vaunted by Dr. Morris, Demerara planters and other competent authorities in this colony do not stand alone. It will be remembered that, in April last, Dr. Morris, the Imperial Commissioner of Agriculture, addressed to Mr. Chamberlain a special dispatch setting forth the excellences and virtues which he had discovered in this seedling. It will also be remembered that he supported his opinions by a letter from Mr. Alistair Cameron, who had extensively reared the plants for sale, and he further claimed to have the support of the general consensus of opinion amongst the planting community of Barbados. In this latter respect we fear that either Dr. Morris overstated the case, or opinion has since undergone a radical change. We find in

recent numbers of the "Barbados Agricultural Reporter" two long communications by Mr. George A. Sealy, a prominent planter in the Island, who holds very strong opinions against the adoption of the much belauded B 147 for general cultivation. As the end of the crop season was approaching, he wrote, he thought it would be interesting to give the results as obtained from the different canes on the estates under his control. The B 147 cane, which he found delicate, difficult to establish, and a bad ratooner, by no means gave the best results. Another seedling, which he obtained from Dodds botanical station—the number of which could not be traced, and which has lately been called the "Sealy,"—was, in his experience, immeasurably superior, having this year yielded on some of his estate three tons of sugar per acre, for first canes, over two tons for second, and just two tons for third canes. The "Sealy" grows very readily, is an upright cane in a hard rind, free from arrows, and is a first-rate ratooner. He adds that he has grown a third crop from the B 147 seedling, which perhaps no one else could say, but the returns were far below those obtained from third crop or even fourth crop grown from "Caledonian Queen," "White Transparent," "Rappoe" or "Sealy." Many persons, he had been told, had been greatly disappointed in the uncertain qualities of B 147 and its delicate and unsatisfactory appearance at times, and had given it up in consequence. By way of refuting the disparaging references made in the Colonial Office correspondence to the "other canes," such as "White Transparent," "Caledonian Queen," and "Rappoe," which took the place of the Bourbon on many of the estates, and which give gratifying results. Mr. Sealy mentions that on many of his estates the average yield from these cane for first, second and third crops this season, has been two tons to the acre; while in many cases the returns for first and second crops were three tons, and for third crops two and a half tons. Mr. Sealy adds that B 147 had hitherto failed on Buckden estate, but was still being tried on a small and cautious scale, and concludes his first letter in these words:

I think that all real agriculturists in this island whose energy, ready resource and perseverance have for many long years conduced to keep up the sugar industry, in the midst of innumerable local difficulties, intensified by the callous treatment of the mother country, have cause to protest against the misleading inferences to be drawn from the correspondence.

just disclosed to us, and to express regret at any sign which tends to create distrust in the soundness of the methods of the department from which it emanates for conducting this portion of the mission intrusted to it.

In the second communication, dated 28th ult., Mr. Sealy states that since the publication of the first letter he had discovered, on comparing notes with many other leading proprietors, attorneys, and managers from all parts of the island, "that the consensus of opinion is entirely unfavorable to the plant B 147, so far as its sugar producing recommendation, or its value as a ratooner, is concerned." Not only had the yield of sugar proved unsatisfactory, but the difficulty of establishing the cane, and its failure as a ratooner, even in good ratooning districts, had been most marked. Concerning the action of Dr. Morris in prematurely advocating the general adoption of a cane which has not yet justified the reputation which he claims for it, Mr. Sealy's views are similar to those repeatedly enunciated in these columns. He fairly states the position in the following sentences:

And it will be agreed that it would have been more consistent with what is expected of any department to which matters of this sort are entrusted, for it to have made the fullest inquiry, and to have obtained results from the widest possible range of experience, and then to have published the concensus of opinion on the subject: as it is, however, from the correspondence to which I have drawn attention, it appears that the Imperial Department of Agriculture in the West Indies has adopted exactly the opposite course. Seeing how easily it would have been for the head of the Department to have obtained, through qualified and reliable planters, the general opinion with regard to this 147 plant after the crop was reaped, and not in April before any fair trial or comparison was possible, there is less reason why he should have allowed himself to be imposed upon in this matter; at the same time it is very evident that those who have contrived to mislead had only their own gain and immediate interests in view, and altogether ignored the real safety of our sugar industry, as well as the reputation of the Department.—Denerara Argosy.

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[In looking over some old papers—preparatory to burning them—such as an editor's den always contains, the following anonymous scroll was found, written some thirty years ago, by a sugar boiler, who, for ought we know, may now be a sugar millionaire, living here or in some foreign clime. The paper is rusty and yellow with age, and its contents are inserted more as a curiosity than for any intrinsic merit.]

BOURBON CANE.

The following letter is from the "Demarara Argosy":

Sir:—I see with much disgust, and some alarm, that efforts are being made to supersede me after having served faithfully and contributed millions of pounds to the wealth of the world, and this has been brought about chiefly from my having been placed under the care of some who did not understand how to treat me.

My name is Mrs. Bourbon Cane; my home was on the banks of the Nile; and I belong to a numerous family. Far in the past the wise men in the East gave special attention to my family. We were carefully bred from seed and placed in nurseries under the care of Doctors in Botany, and finally they decided that I was the best adapted for the purpose of producing sugar for the use of the wise men in the East. It cost so much time and attention to arrive at this decision (so tradition says) that the wise men of the East made a law that any person who should attempt to propagate my family from seed should suffer death. This will give some idea of the vagaries the Doctors in Botany must have met and had to overcome before they could arrive at their conclusions about me. Now active measures are being taken to supersede me and take into service Miss B 147. This girl is my near relation and was rejected by the Doctors to whom I have referred. In the latter part of the sixties and part of the seventies in this colony, I was placed under the care of young men who had not sufficient experience and did not, under certain conditions, know how to treat me, so that my health suffered much, which caused great loss and confusion, and to make matters worse, those in charge of me decided to stop my chief daily food (manure), and I became very ill. You will hardly credit the statement, but such is the fact that those who had destroyed my health by ill-treatment and starvation, propagated the belief that I was diseased and unfit for further use, and a substitute must be found. Had it not been for some of my old friends who came to my aid I do not know what would then have become of myself and those who were dependent on me. Those whom I have served faithfully and contributed large fortunes to keep in comfort, instead of seeking to place me under proper care, seem to have joined with the Great Doctor at the London office, to try and supercede me, and take into favor Miss B 147.

In Barbados, a young gentleman with little or no experience about me, comes forward and states that I can only give $1\frac{1}{2}$ tons of sugar to the acre, while Miss B 147 gives $2\frac{1}{2}$ tons. I have no doubt that my young rival has received attentions from the youthful lover, which had been denied to me. But even in that miserable island, exposed as I am to the blast of dry salt winds, I have in the past, under my old friends, yielded three tons of sugar to the acre. But I suppose my friends are all dead, and hence their silence in my defense.

I have much to complain about. In the past my friends used to turn me out in the form of bright yellow crystals, and when so dressed and placed in market, I had no end of lovers and no rival could stand before me. But now I am turned out ill-dressed and dirty-looking, and in that state I am sent to other countries to be dressed as "refined sugar," which means that I am mixed up with others who are not of my family (beet), and made into a white composition. After I am mixed and so dressed and remain quiet for a few months, I find myself covered with minute insects which cause strong men, when they consume me as food, to sneeze and cough, the children to be seized with gripes, and the weak and old to die. I wish I could induce my traducers to follow me to the isles in the East; they would there see that I am not only giving four and five tons of sugar to the acre, but I am making fortunes for thousands. Even in thi scolony I have time after time given three, four and five tons of sugar to the acre, and at present I am giving some of my friends handsome incomes annually, and would do the same for all with whom I am connected if they would give me intelligent and proper treatment.

I will close for the present,—Yours obliged,

MRS. BOURBON CANE.

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STANDARD SUGAR ANALYSIS.

Since the publication of Prof. Wiley's investigation regarding the analysis of sugar, there has been much study of the principles involved and discussion of the system which he recommended, and which has been adopted by the American Government. From Sugar Beet it is learned that "at the international commission for the unification of methods for sugar analysis it was decided that the polariscope should be of a shadow standard type; the apparatus should always be

placed in the same position, and at a reasonable distance from the source of light. So that polarizing nicol by radiation cannot be influenced by heat, it is recommended to use lamps of considerable intensity, triplex gas burner, Auer burner, electric lights, etc. Before the analysis commences, the operator should verify the weights, the capacity of flasks and the polarization tubes. He should, before and after each observation, make sure that the apparatus used is exact, by using standard strips of quartz for comparison; the light should be of a constant intensity. There should be several polariscopic readings and an average taken of these. The sugar sample should be of a standard weight or a multiple of this, and placed in a flash of 100 c. c. or a multiple of 100 c. c. capacity. For decolorizing the sugar solution, subacetate of lead may be used (3 parts in weight of neutral acetate of lead to 1 part litharge and 10 parts water). Bone black and decolorizing compounds should be excluded. The operation of moisture estimation, in the case of normal sugar, is conducted at 105° to 110° C.; for colonial sugar, but no special methods can be prescribed. For ash estimation use Scheibler method, using pure concentrated sulphuric acid. The incineration should be made upon at least 3 grams of sugar, in a platinum or porcelain capsule, at the lowest possible temperature, that is to say at 750° C.; from the weight obtained 1.10 should be subtracted. The alkalinity.—As the alkalinity of sugar is no positive indication of its keeping powers, the commission did not suggest any mode for its determination. Invert sugar.—The quantitative estimation of invert sugar in raw sugars shall be done according to the Herzfeld method. It is recommended that the sample of sugar to be tested shall be kept in well closed glass bottles. In order to obtain very accurate results in sugar analysis the total sample should weigh not less than 200 grams.

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CUBA.—All reports concerning the sugar crop now being harvested indicate a good yield, and the total crop for the whole island will be nearly 500,000 tons. The weather has been fairly good for ripening the crop, but the lack of first class mills will be felt, and for this reason, the outcome may not come up to the estimate. The crop of the island will probably increase from year to year, but will have to pay full duty unless congress legislate otherwise. Probably the entire crop will be shipped to the United States.