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New York Sugar Market, Jan. 17.—Raws unchanged. Refined unchanged. Net cash quotations are: Centrifugals, 4375c.; Granulated, 534c. Receipts, 29,961 tons. Meltings, 28,000 tons. Total stock in Four Ports, 88,151 tons, against 86,190 tons last week, and 194,621 tons last year. Estimated afloats to the United States from Cuba and West Indies, 10,000 tons; Java, 12,000 tons; Hawaii, 20,000 tons; Europe, 20,000 tons; Peru, Demerara, &c. 20,000 tons; total 82,000 tons, against 95,000 tons last year. There is little to note in the raw sugar market except continued steadiness for the week, with only moderate transactions at the current quotations. The receipts were equal to the meltings and stocks remain practically unchanged. Supplies in Cuba are increasing, but offerings from there and from the West Indies are still moderate and meet with ready sale.

The consumption of sugar in the United States for the year 1900 was 2,219,847 long tons. For the previous year, the consumption was 2,078,068 tons, showing nearly seven per cent increase, which is above the average increase for previous years. Of the total consumption only about 270,000 tons were credited to Hawaii, and about the same amount was produced in the United States. The beet sugar produced in the United States during the same year was 82,736 tons, and of maple sugar, only 5,000 tons were produced.

The communication of Prof. Crawley, relative to spots of poor soil in localities where the surrounding soil is good, will attract the attention of other cultivators besides planters. Such spots are occasionally found here as in other countries, and how to deal with them is often a puzzle. He suggests a remedy, which no doubt will bring good results, at least in some localities.

At the ninety-second half-yearly meeting of the Colonial Sugar Refining Company, lately held in Sydney, the report for the six months ending Oct. 1, showed that the profits, after making the usual deductions, amounted to £89,381 3s. 5d., and, with the previous balance of £91,596 8s. 3d., brought the total amount available for distribution to £180,977 11s. 8d. The board of directors proposed to appropriate £89,344 to the payment of a dividend at the rate of 10 per cent. per annum, free of income tax, and to carry forward £91,633 11s. 8d. The continuance of the dry weather in Queensland, and the sharp frosts in New South Wales, have tended to reduce the out-turn of the crops now being cut, and it is therefore improbable that the anticipation of an increased yield on the return for 1900 will be realized. The Chairman said that it was unfortunate that they had had to buy so largely in Java for this year's consumption, but until the weather conditions improved the production of these colonies must continue to fall short of the consumption.—Exchange.

A recent writer says: "Cane sugar can probably be produced, under like circumstances—as regards bounties, &c—for less cost than beet sugar, and the best cane sugar is superior to beet sugar.

"In the beet sugar industry, agriculture and manufacturing have been absolutely divorced. This is true of all other industries of any moment except the cane sugar industry, where the process of divorce is going on. No cotton planter would dream of spinning and weaving his own product; no sheep-owner would attempt to manufacture woollen goods. But the cane sugar planters have not yet divested themselves wholly of the idea that they should manufacture sugar as well as raise cane. But the change is in progress. There is a marked tendency to the production of cane by free labor on small tracts of ground, and public and private enterprise is awakening to the importance of developing cane that will produce more to the acre, and yield more sugar in proportion to its weight. With a complete modernization of the industry, the cane industry will no doubt recover prosperity."

The following is an extract from a Report by Neville Lubbock: "There is one condition of the sugar industry in Trinidad which is, I think of great interest and which, I believe exists in no other sugar-producing country in the world. It

is this, that a large proportion—about one-fifth of the crop—is now produced, so far as raw material, viz, the canes are concerned, by small farmers. I take some credit to myself for having been the pioneer of this industry. When I was in the Colony in 1882, I took a good deal of pains to endeavor to start the system. With some difficulty I persuaded some eight small farmers to start growing canes with a view to their sale to the factories, and from 1883 onwards the industry has steadily increased, and last crop there were no less than 6,696 of these small farmers, who produced 106,741 tons of canes. At first the system arranged upon was the purchase of these canes standing and for the factory to do the cutting and the hauling. It subsequently appeared that the farmers preferred to do their own cutting and hauling, and the canes are now delivered at the factories or at loading stations, where the weigh-bridges are erected. The system appears to be still extending, and I fully expect before long to see fully one-third of the sugar crop of the island produced in this manner.”

Readers of this monthly will find in it an interesting account of the sugar industry in Java and Queensland, both of which countries were visited by the writer, who is the chemist on the Papaïkou Plantation. Some facts are presented which are not generally known here, and those who are familiar with the methods adopted in Hawaii, will note the advantages which we possess over both the countries referred to. Java, however, has one great advantage in the abundance of cheap labor, although it may be of an inferior quality and is secured at very low rates, the Dutch government apparently having supreme control of it throughout the island. The Dutch government is largely interested in this as well as other leading industries there, and controls the native population, as they are probably not controlled in any other sugar growing country. This, however, may still be all for the benefit of the natives themselves. In Queensland, the labor question is a very different one, and laborers are not easily to be obtained. The larger plantations import South Sea islanders, but this source of labor will probably be cut off, when the new laws of the federal government are enforced, which will probably forbid the importation of islanders or even Chinese under contracts of any form, though it is possible that some compromise may be effected, enabling the importation of foreign laborers. The

Chinese are willing to work on sugar plantations, but the prejudice against them is so great as to amount to a virtual prohibition. The frequent and prolonged droughts in Queensland militate against the expansion of the sugar industry, but it is probable that a system of irrigation, with water from the numerous streams will in time overcome this drawback.

The bill to provide for the establishment of Sugar Experiment Stations in Queensland, gives power to the Ministry to establish and equip stations for conducting experiments in connection with sugar cane and its products, for preventing the spread of disease in cane, and for otherwise promoting the well-being of the sugar industry. Provision is made for the appointment of a Director of sugar experiment stations, (Dr. Maxwell), who may from time to time appoint such inspectors and other officers as may be necessary. There is to be established a fund to be called the Sugar Fund, for which purpose the Minister is empowered to levy an assessment of one penny on every ton of sugar cane received at a sugar works, such assessment to be paid in the first instance by the owner of the works, and to be borne in equal parts by the owner of the works and the grower of the cane, each contributing one-half penny per ton. Provision is made for endowment from the Consolidated Revenue of £1 for each £1 so contributed, with provision for an advance by the Government in anticipation of the first annual assessment. The Director of sugar experiment stations is required to make an annual report upon the stations under his control, the administration of the fund, and generally on the condition of the industry in Queensland. Regulations may be made by the Governor-in-Council. These are to be presented to Parliament, which may within forty days annul the whole or any part by resolution; but the regulations are to have the force of law immediately on publication, and subsequent action of Parliament is to be without prejudice to anything done in the meantime under the provisions of such regulations. Regulations may impose a penalty not exceeding £20 for any breach.—Sugar Journal.

In no country probably, is the beet sugar industry more prosperous than in Germany, which has about four hundred factories, nearly all of which are in one great combine, which handles the crop and regulates the price and terms of sale.

The German laws are made with special reference to securing the best mode of disposing the enormous crop so as to secure to the beet growers the highest prices, at the same time that it prevents a glut in the sugar market. A large part of the crop is sold for export, and here is where the combination proves to be of great service to the growers and the factories or refineries. Special efforts are constantly being made to improve the processes of manufacture, and a good factory is expected not to lose more than one per cent of the sugar content of the beet, as shown by laboratory tests. The Germans are expecting strenuous competition when the Cuban sugar factories again resume operations, as they are sure to do soon,—and are bending every effort to devise ways for making sugar from beets as cheaply as it can be produced from cane. Cuba, under American protection, is bound to become a great cane sugar producer, and will surely make enough to more than supply all the foreign sugar that America will require. And this within the next ten years.

BET SUGAR.—The soil of some portions of California is developing most favorably for sugar beet culture. The Oxnard Company, in its last year's campaign, sliced over 70,000 tons of beets, and the average sugar in the beets was reported by the chief chemist to have been 18 per cent. This is even better than the average extraction in Europe, where the work of cultivation and extraction is supposed to be the best. There may be something in the soil of California which gives this extraordinary result. At all events, it cannot help giving to that industry a very great impetus. The amount paid by the Oxnard factory to the farmers for their beets was \$350,000. With such favorable results, the beet sugar industry in that State will most certainly increase very rapidly. Already the beet sugar interest of California exceeds \$1,000,000 annually, and will increase from year to year. It is said that the refineries find it for their interest to mix the cane and beet sugars, as the latter is not considered quite equal in quality to the cane sugar. Experts claim to be able to distinguish one from the other, but probably nine out of ten housewives cannot do so, unless pure samples of each are placed before them to be tested.

FERTILIZERS ADVANCE IN PRICE.

Within the past year, the prices of all kinds of commercial fertilizers, such as are used on the sugar plantations of Louisi-

ana, have advanced fully twenty-five per cent. This has been brought about by the greatly increased demand that the above mentioned class of goods has been subject to, not only from the Southern States but from foreign markets as well.

The State of Georgia, during the past year has alone used the large amount of 400,000 tons of manipulated fertilizers, the basis of which is dried blood, tankage and cotton seed meal. By the combination of capital, fertilizer corporations have been formed and the business lines extended greatly in other directions, as is evidenced by the fact of Southern markets having, within the past twelve months, exported to Europe phosphates valued at more than \$50,000,000, an increase of about one hundred per cent over similar exports of the year previous.

This is not the limit, though, of the exportations, for the fertilizer trade with the Hawaiian Islands and other tropical countries, has showed a phenominal increase. An idea of the business done with Hawaii may be conceived when it is stated that, several months ago, a Western packing firm shipped 8,000 tons of ammoniates to a single planting company of that island. Such heavy foreign demands have naturally tended to raise the price of the article to all consumers throughout the United States. Planters, however, need not think that so sudden a rise in fertilizer values will likely be repeated soon, for the above mentioned combined capital is making good progress in opening up natural phosphate beds, which abound in some of our Southern States, and, in this way, the supply will be kept equal to the increased demand.—*Sugar Planter's Jour.*

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OUR UNDEVELOPED WATER RESOURCES.

The bountiful rains of this month have long been needed to fill the mountains, plains and subterranean reservoirs of these islands. The opening of springs and hidden basins of water in places where none had heretofore been found, and where it seemed impossible to find it, will certainly result in extending the area of land that can be devoted to cultivation, especially the dry and sandy plains, once thought to be worthless. It seems now as though there might be no limit to the amount of water that may be drawn from the foothills on each of the islands of this group—and if here, why not in other lands possessing similar conditions? When Capt. Wilfong took charge of Pahala plantation in Kau, in 1876, that sugar plantation scheme was threatened with bankruptcy, for lack of rain and

water for irrigation. He stoutly maintained that there was an abundance of water on the mountain, if it could only be tapped and brought down from the rocky fastnesses, where it was hidden, and spent many days and nights on the mountain searching for it, and declared he could hear it, when his ear was placed on the rocks. He secured small supplies only; but later efforts in the same line have been successful and what has already been obtained from these hidden mountain springs have made Pahala one of the most valuable sugar estates on these islands. The Captain always thought that the water obtained by the Israelites at Mount Sinai came in the same way, by searching for it, and when the right spot was found, the waters gushed out to the astonishment of the thirsty Israelites. The successful efforts now being made on these islands to secure water supplies from mountain sources are most encouraging, and give promise that in the near future our irregular but bountiful winter rains may be supplimented by more permanent streams drawn from the mountains.

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SUCCESSFUL SUGAR CANE EXPERIMENTS IN BARBADOES.

Those who are watching the experiments made abroad to test the saccharine qualities of new varieties of sugar cane will be interested in the statement received from London by President Schaefer of the Planters' Association, and published below. Perhaps the tests, had they been made here, under favorable circumstances, might have given even better results. They show an advance however. There is no reason to doubt that the same improvement may be obtained for cane, as has been with beets. Quite a number of new cane seedlings are being tested in the West Indies, Java and Louisiana, and some of these have already proved on a small scale to be an improvement over any at present cultivated. Whether the same results will be obtained when planted on a large scale and in the ordinary field planting way, remains to be seen. The results so far are most encouraging.

During the past season important experiments have been conducted in Barbadoes by Professor d'Albuquerque, honorary consulting chemist to the Imperial Agricultural Department, and Mr. Bovell, superintendent of the Botanic Station, to test the commercial value of various descriptions of seedling and other sugar canes, with the object of assisting the planters in

selecting the canes most suitable and profitable. The extreme varieties of soil and climate typical of comparatively large areas in Barbadoes are high red soils and low black ones, and between these two come every intermediate variety, so it is obvious that some canes would be more productive in one locality than in another. The cane most favored by the planters recently is the white transparent, and this has been adopted as the standard for comparison. An arrangement was made by which the canes to be used in the investigation were to be grown not on experimental plots in the Botanic Gardens nor in artificially prepared soil, but on seven different estates distributed over the island, "grown by the planters themselves under exactly the same conditions as other canes. There was nothing exceptional in their treatment. Hence the results may be regarded as fairly typical of the locality in which they were grown." Fifteen selected varieties of sugar cane were compared on five black soil estates, and ten varieties on two red soil estates. Each variety was allotted a plot of 100 holes, and at nearly every station there were two series of the varieties, so that there were two plots (duplicates) of each variety, serving to show at each station, on the field chosen, the variation to be expected with each variety from one part of the field to another. Finally, the crops when reaped had to undergo identically the same treatment at the hands of the investigators, and the results have proved extremely interesting. Valuable tables have been prepared showing for each variety in the black and the red soils separately the quantity, in tons per acre, of canes and of tops; the percentage of juice produced by mill; the pounds per gallon of saccharose, of glucose, and of solids not sugar; the quotient of purity; the juice, in gallons per acre; the saccharose, in pounds per acre; and the sugar, in tons per acre. Taking the last two only we find in the black soil experiments that while the standard white transparent yielded 4,528lb. of saccharose and 2.41 tons of sugar, seedling B.147 yielded respectively 6,012lb. and 2.90 tons, followed by B.208 with 4,988lb. and 2.83 tons. Three other canes, Queensland creole, Jamaica cane, and B.254 being rated above the standard. The Bourbon cane made a very poor show, being the last on the list with only 841lb. and 0.47 ton. On the red soil the order of merit was changed, B.208 leading with 6,239lb. and 3.34 tons, B.156, which was tenth on the black soil list, being second with 6,591lb. and 3.32 tons, and B.147 third, with 6,794lb. and 3.31 tons. Combining the

results for the two soils, the standard white transparent, with yield as above stated, becomes eighth on the list, B.147 being in the first place with 6,291lb. and 3.10 tons, B.208 following with 5,443lb. and 3.02 tons, Queensland creole third, with 4,404lb. and 2.69 tons, and Jamaica cane fourth, with 5,001lb. and 2.67 tons. Another similar table shows the results obtained on three black soil estates with B.147, and white transparent, the former proving by far the better cane, producing 6,999lb. and 3.47 tons, against the standard's 4,527lb. and 2.41 tons, or in favor of B.147 to the extent of 55 per cent in saccharose, and of 44 per cent in the mean yield of marketable sugar, in other words a gain of more than a ton of sugar per acre. With such results as these there is no hesitation in deciding on B.147 as the best all-round cane for Barbadoes, but the Imperial Commissioner of Agriculture, knowing from experience how reckless the planters have been in the past in going in for extensive cultivation of a particular cane because it has been profitably grown somewhere else under totally different conditions of soil and climate, advises the planters, in the first instance to select three or four only of the most promising canes, which have now been experimented with and which may be likely to suit their district, and, finally, to adopt the variety which steadily stands the test of local conditions. With 100,000 acres of land under cultivation it is obvious that if the introduction of an improved variety of cane insures an increased yield of even only a quarter of a ton of sugar per acre, the planters and the island generally would derive immense benefit from the change.—London Times.

There are two leading banana trading companies in the United States—one, the United Fruit Co. controls the trade east of the Mississippi river, and the other—the Western Banana Association controls the western portion of the Republic. The war is between these two companies. As most of the bananas are grown in Nicaragua, the fight is probably to settle which shall control the Nicaragua market. Owing to this banana war the price of this fruit is low, each of the rival companies hoping to force the other to submit to its terms, and eventually one or the other will probably control the supplies and the whole market. Another statement is that the price has been reduced so low by this banana war, that the Central American banana growers refuse to continue to supply the fruit for the low price offered. At the latest advices, a

delegation of Central American banana growers had visited New Orleans and St. Louis, hoping to straighten out the trouble, and enable them to carry on the business of raising bananas, and obtaining a fair price for their fruits. If we are not misinformed, the entire trade is in the hands of foreigners, mostly Italians and other Europeans.

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FERTILIZING OF SOILS CONTAINING CORAL SAND.

There are many patches of what are called "sandy soils" along the coast of the Hawaiian Islands, that is, soils made up wholly or in part of coral sand. These soils in appearance are very much like the siliceous sandy soils of other countries. Some of them are quite fertile, and yield good crops of cane continuously for many years; while many others give but indifferent results. These patches bordering on or enclosed within good fields, present quite a problem to the cultivator. The soil is often so porous that it is difficult to irrigate, and loses its water so readily through percolation and evaporation as to require very frequent irrigations. We have often been asked to advise fertilizers for these soils, there being an impression, from the indifferent results of the ordinary high grade fertilizers, that they need special fertilizers. Our recommendation has invariably been to use no nitrate of soda, and, in the case of very sandy soils, neither sulphate of ammonium nor muriate of potash. The following experiments were made for the purpose of obtaining more data concerning the retentive power of these soils both for fertilizers and for water.

SOILS USED.—Four soils were obtained from Kahuku Plantation as follows: No. 1 contains 71.25 per cent carbonate of lime, and yields about 30 tons of cane of very good purity.

No. 2 contains 77.37 per cent carbonate of lime and yields about 20 tons of cane of fair purity.

Nos. 3 and 4 contain 81.85 per cent and 91.07 per cent respectively carbonate of lime, and grows very poor and stunted cane.

These soils were placed in iron pipes two feet six inches long, one inch diameter, the pipes being filled to within six inches of the top.

EXPERIMENTS.—1. One gram each of sulfate of ammonium, muriate of potash, and nitrate of soda were dissolved in 1000cc of water, and of this amount 500cc, representing one-half gram each of the chemicals, was poured upon the soils,

keeping six inch head, and allowed to percolate through. The time required to penetrate the two feet was observed, together with the total amount of water passing through, and the total time required.

Five hundred cc of water, containing one-half gram sulphate of potash, was passed through new portions of the soils. The water passing through the soils was collected and analysed, at the same time blank experiments made by passing pure water through the soils to determine if any water soluble ingredients were washed out. Deducting this correction, the following data were obtained:

Amount moisture in the original soils	3.73%	2.03%	1.08%	0.61%
Carbonate of lime in soil	71.15 "	77.37 "	81.85 "	91.07 "
Weight of soil taken	365 grs	407 grs.	362 grs.	374 grs.
Time required to penetrate two feet.	55 min.	19 min.	12 min.	8 min.
Total water passing through	320 cc	342 cc	345 cc	355 cc
Time required for the above water to pass through	335 min.	180 min.	95 min.	95 min.
Water holding power of the soils	49 %	39 %	43 %	38 %
Moisture in soils after 10 days	31.5 "	20.4 "	18.8 "	16.6 "
Sulfate Ammonium lost	8 "	42 "	59 "	86 "
Muriate of Potash lost	none	44 "	56 "	65 "
Sulfate of Potash lost	"	8 "	25 "	28 "

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Nitrate soda practically all was lost, there being little difference in the various soils.

RESULTS.—Most Hawaiian soils take up a large quantity of water and hold it very tenaciously. The soils also, as a rule, have great power of fixing fertilizers and preventing their escape in drainage waters. These two facts make irrigation and fertilizing a simpler problem than it would be were the reverse the case. On the other hand, the water-holding capacity of these sandy soils, especially Nos. 2, 3 and 4 is far below the average; that being for 19 Hawaiian soils examined by our Experiment Station, 57.2 per cent. There is even a greater difference when we consider the power of retaining the water. The 19 soils above mentioned contained an average of 38.4 per cent of water at the end of 13 days whereas these sandy soils retained but from 16.6 per cent to 31.5 per cent at the end of 10 days.

This latter fact compels the plantations to irrigate frequently. The soils, moreover, being so porous soon lose their water into the subsoil, in the case of No. 4 in eight minutes.

Again, many of these soils contain sand to a great depth, Mr. Muller, the chemist at Kahuku, reporting that he had seen

the above soils down to a depth of six feet, and they were composed of sand at that depth. These facts emphasize the danger of loss of those fertilizers which pass through the soil unchanged.

RECOMMENDATIONS.—Soils like No. 1 can be fertilized with any of the high grade fertilizer containing no nitrate of soda without danger of much loss, provided the water be used carefully. The others should be fertilized with blood, since it has its ammonia in a comparatively available form, or tankage, and phosphates and sulphate of potash. If this mixture should not act well in any particular case the soil cannot be fertilized to advantage. We are indebted to Mr. Norman Watkins for most of the analytical data upon which this report is based.

J. T. CRAWLEY.

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The English are the largest consumers of sugar in the world. They import 1,500,000 tons of sugar every year, which is equal to thirty per cent of the world's output of beet sugar. Their consumption of sugar is equal to 86.15lbs. per head of the population per annum. The next largest consumer is the United States, but the consumption there is only 65.49lbs. per head; in Denmark the demand falls to 43.65lbs.; Switzerland uses 42.98lbs.; France 28.24lbs.; and Germany only 27.14lbs. per head, although she is the chief producer of beet sugar. This valuable article of food is used more freely in England than in any other country. The English are the jam makers of the world, but their jam makers import all their sugar, and also some of their fruit, and are simply mixers and boilers of the commodity they export to all the corners of the earth.—Ex.

SUGAR TAXES.—In all foreign countries there are internal taxes on the sugar consumed, ranging from £25 a ton in Italy, £24 a ton in France, £22 10s. in Holland, £18 in Belgium, to £11 in Russia, and £10 a ton in Austria and Germany. Thus, while the German must pay 3½d. a pound for his sugar, the Englishman can get a similar quantity for 1½d. But Mr. Stein says, as an expert, that the price of sugar is still ruled by the cost of production. England is the only free sugar market, and London is the great sugar market of the world. The price of sugar in London rules the price of sugar all over the world, plus the consumption taxes in each protected country. The taxed sugar does not rule the price; the cost of production does. To stimulate the industry foreign powers have given

bounties to the producers on all sugar exported, varying from £2 to £3 per ton—a very handsome premium. The bounty in France, for instance, is estimated to amount to nearly three millions sterling a year, but France makes a revenue of some twenty millions out of her sugar by internal taxes, and the bounty is taken out of the pocket of the consumer, that the industry may be encouraged and improved.—English paper.

Every State and every large city has its health authorities who are testing and analyzing the foods and beverages offered for sale, and who, together with the doctors, may be trusted to give the public warning of dangerous articles of diet. They have given warnings, and Congress should respond with a pure food law. But it should prohibit only those articles which are beyond question injurious. For the rest it should be content to require publicity. Twenty-five years ago cottonseed oil was deemed unwholesome; it is now advertised under its own name for culinary purposes, and the persons who put it on the market deem it worth while to contrast it with pure leaf lard to the disadvantage of the latter. The buyer is entitled to know what he is buying, and no unquestionably deleterious article should be sold for food or drink. The lawmaker should be careful to keep within these bounds. — N. Y. Jour. Com.

During the year 1899 the Russian government derived 67,522,839 rubles, or about \$35,200,000 from sugar revenues, whereas the estimates of the budget amounted only to 58,042,000 rubles, thus giving a surplus of 9,480,839 rubles. During the previous year, 1898, the sugar revenues amounted to the value of 58,561,779 rubles. The increase in 1899 over 1898 thus was 8,961,060 rubles, or about \$4,661,200.—Lou. Sugar Planter.

A London fruit dealer makes the following comments on pine apples for the English market, but they may perhaps apply as well to other markets. The only pine apple being sold in England now is the Smooth Cayenne, but not as many people would have us believe, on account of its superior quality. The chief reason it sells so well is that it is a good looking pine, a fruit of good size, fine color, and a handsome top, the weight ranging from three to eight pounds, but the average about four to six pounds, larger not being required in England. The second reason for the Cayenne selling better than the

much finer flavored Ripley is that it gets to market in better condition. Many dealers lose money over the Ripleys being black in the center, although apparently good on the outside. The pines that sell best are those that keep best in condition, and are the sweetest.

BENEFICIAL INSECTS.—Whenever and wherever an insect is observed in the act of destroying other insects, it should be carefully watched and its habits noted. See if it attacks a beneficial insect or whether an injurious one. Note whether it destroys its host, or prey, by sucking its juices, or attacks and devours it bodily; whether it is an enemy to the egg, larva, pupa, or fully developed insect, and also whether a parasite or simply a predatory insect. You should also try to find out whether the beneficial insect attacks its host as a larva or imago, or both. It might be a good idea also to note what insects attack different ones of our common weeds, and to what extent such attacks are carried; whether or not these same insects attack cultivated plants likewise.—Nebraska Ex. Sta. Bulletin.

Since 1840 our National wealth has increased five times as fast as our population. Who shall say that with that wonderful increase in wealth there is not means in abundance to remove all the misery and all the evil conditions among the humble classes which at present are stains and sores upon our body politic? The advance of industry which has brought us this wealth beyond the wildest dreams of avarice, has also brought on conditions which make it an absolute impossibility for some people to live decent, respectable lives. The rich have not even begun to do what they ought to do. Men that I almost worship for their generosity and solicitude for those that have less, are not giving in proportion to their wealth the half that was given by their families a generation ago. Have we the right to take all this wealth and do nothing to correct the evils created in its production? Can you accept these millions and shut your eyes to the evils which weave themselves about the producers? Can any one be content with such conditions? Good God! is this the end to which we have been working all these centuries? For Heaven's sake! is this the result of our industrial development, and must our prosperity as a nation be purchased at such a staggering price?—Abram S. Hewitt.

ORANGES.—The acme of perfection in the orange kingdom is the navel. Its praises are sung and its merits known all over the world. California lemons are fast becoming as well and favorably known and only last week we published a series of analyses showing their superiority over the Mediterranean fruit.

Among the requirements of a lemon for market are comparative seedlessness, thin rind and light pulp. These the California lemon possesses in a marked degree. But it has remained for Dr. Woodbridge, the well known agricultural chemist of this city and South Pasadena, to succeed in producing a navel lemon, absolutely seedless and possessing the characteristics and advantages of the orange after which it is named, for he has named the new lemon California Navel Lemon.

It shows an entire absence of seeds, the texture and thinness of rind; the navel also is very marked and the shape, etc., follows very closely that of the orange. Here, however, the resemblance stops, for the acidity runs very high.

Origin? That's another question. We tried to get the doctor to tell, but he wouldn't. One thing, however, he stated. It is no experiment. The fruit has presented just the same characteristics for two years and he hopes it has come to stay.—Cal. Cult.

The navel seedless orange is said to have been found in the interior of Brazil, and thence introduced to one of the southern ports of the United States, from whence it was taken to Southern California, about forty years ago. where it has been largely propagated, having found there a climate admirably adopted to its development.

THE CANE BORER IN LOUISIANA.

Late papers from Louisiana furnish reports of an interesting meeting of sugar planters, at which the cane borer was the subject of discussion. By request of the Association, Dr. Stubbs was requested to prepare a report giving all the information obtainable regarding it. It seems that the borer has been known there for fifty years past, but has become more destructive of late years than formerly, and in some instances recently, the cane has been made almost worthless for grinding. Reports on this pest were made both by Dr. Stubbs and his assistant, Prof. Morgan. The latter gentleman gave a very full description of the pest, its habits, etc., with illustrations

of how it enters the cane and does its deadly work. Among other things it was stated that the borer's life was from seven to ten weeks. In the course of his remarks Dr. Stubbs said:

"In the Hawaiian Islands this year I paid a great deal of attention to the borer. Over there they fight the pest unlike we do. They take a lot of little boys and put them in a cane field with a sack. The boys are taught to examine the leaves thoroughly. They are taught to discriminate between the parasite and those that are not parasites. Where there is a black speck in an egg the boys are cautioned not to touch them; that they are to be left alone. They are paid so much by the manager. I was taken through a field and shown how they do it."

Mr. Quinton Hogg of the West Indies, who was present, said that both the borer and the fungus disease played frightful havoc in Barbadoes, but their attacks were worst after a bad season of the cane.

Mr. Henry McCall made the following statement:

Towards the latter part of the season the borer is generally found in the tops after the canes are cut in the field. We have investigated there and we find any quantity in the tops; and we find them in the tops after the land has been burned off. We burn some pieces of cane on our land early in December or the latter part of November; and that cane, while the leaves were well burned, the tops were only scorched; and that is my experience in burning; the tops are merely partly scorched and you will find two or three mature joints that are not burned at all. That is where he is now, and he is in the seed cane—been there three months. * * *

We have thought that perhaps we might attempt to rake all the trash up on the top of the row, and let it thoroughly sun-dry before burning. It might be a costly plan; but even if it cost a good deal, if it was not clearly too much, why several thousand dollars would not be ill spent in doing that if it were successful. We suffered considerable damage to our cane and there was certainly a deficit of 30 per cent in our tonnage.

Prof. Stubbs: "In 1900 we had no borers to speak of. I don't think until the last few days that we have seen a half dozen during the grinding. But I left a row of cane growing—it is still growing—and you can go there and find borers in that cane. Today Prof. Morgan found two or three stalks with the borer, and the borers have been depositing evidently

since I cut the cane in the fall. That piece of cane the boys have been eating all season, and I have not heard a single one complain of the borer, while now there are quite a number in it. That is the reason why I suggest that you cut down all the young stubble coming up. If we have no cold between now and the end of winter they will carry perhaps a great many borers for the spring crop.

"The eggs are believed to be laid upon the green leaves, and the young worm on hatching descends the leaf to the stalk, and after eating for some days the parenchyma of the leaves and the outer cuticle of the stalk enters the latter and begins his destructive work. Hence, in fall of the year, the borer will generally be found in the upper part of the stalk, and if he is not sent to the mill, may be hid away in the lower portion of the top which is left in the field. Therefore, burning the tops should be thoroughly accomplished to destroy every possible borer that may be present.

"In reviewing the numerous replies received, it is evident that nearly every correspondent was familiar with the borer, and at some time had suffered from its attacks. It is probably true that there are very few plantations where the borer does not exist at all, and why it should be kept in subjection, yea, almost obliterated, in some localities, while existing in destructive numbers elsewhere, is not clearly understood. Everybody (with but few exceptions) burns the trash, an acknowledged aid in depreciating their numbers, yet, with this only known effort practiced alike in every community, the borer multiplies to a destructive extent in one section and is practically subdued in another. Again, a plantation practically exempt from its ravages for years may suddenly become a theater for its most destructive efforts, and then, as quickly as it came, the borer may disappear and be seen only in very limited quantities for years to come."

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UNITED STATES SUGAR CONSUMPTION, FOR 1900.

We give herewith our annual figures of the sugar trade of the United States. They show the total consumption of all sugar, foreign and domestic, in the entire country, including the Pacific Coast, to have been 2,219,847 tons, against 2,078,068 tons in 1899, an increase of 141,779 tons, or say 6.82 per cent increase. The consumption of 1900 consisted of 174,450 tons domestic cane sugar, 82,736 tons domestic beet sugar, 5,000

tons maple, 7,617 tons molasses sugar, a total of 269,833 tons domestic production, and 1,569,194 tons of foreign cane sugar, 373,077 tons of foreign raw beet sugar, and 17,743 tons of foreign refined, a total of 1,960,014 tons of foreign production (of which 250,885 tons Hawaiian considered as foreign in these figures). Tables herewith show from what country these sugars came. The amount of refined sugar which went into consumption in 1900 was 2,178,615 tons, of which the A. S. R. Company manufactured 1,465,349 tons, or 67.3 per cent; the independent refiners, 627,137 tons, or 28.7 per cent; the beet sugar factories which make refined sugar, 68,386 tons, or 3.1 per cent, and the foreign refiners, 17,743 tons, or 0.9 per cent; 51,232 tons were consumed in the raw or plantation state. The undistributed stock of refined sugar we estimate at 30,000 tons, against 20,000 tons last year. The difference between raw and refined averaged .754c. per lb., against .50c. per lb. in 1899.

In 1899 the total amount of refined sugar which went into consumption was 2,022,134 tons, of which the American Sugar Refining Co. manufactured 1,385,608 tons, or 68.5 per cent; the independent refiners, 585,765 tons, or 29 per cent; the beet sugar factories, which make refined sugar, 44,826 tons, or 2.2 per cent, and foreign refiners, 5,835 tons, or 3 per cent; 55,934 tons were consumed in the raw or plantation condition.—Willett & Gray.

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*NOTES ON THE SUGAR INDUSTRY IN QUEENSLAND
AND JAVA.*

EDITOR PLANTERS' MONTHLY:—The sugar industry in Queensland is in the hands partly of a large corporation,—the Colonial Sugar Refining Co., Ltd., and partly of individual planters, owning more or less extensive plantation or farms. The largest of these plantations have their own mills, while the smaller planters either sell their cane to one of the private mills, or have it manufactured into sugar at one of the central mills, in which they are share holders, i. e., they are responsible for the interest to the government, who advanced or guaranteed the capital for building these mills.

The farmers, in many instances, clamored for these mills, because they considered themselves unfairly treated by the private mills. Whether this was the case or not, it is at present very questionable, whether they are better served by the central mills, as many of the shareholders—all sugar farmers—have not only been unable so far to repay, as agreed, part of

the capital advanced, but have even in some cases failed to pay the interest in full. This unsatisfactory state of affairs is to a considerable extent due to a number of dry seasons, but to a greater extent it is due to lack of experience, shortsightedness and disinclination on the part of the sugar farmers to follow advice. The Colonial Sugar Refining Company owns and controls a number of up-to-date sugar mills, some of which are run in connection with a plantation, although the greater part of the cane ground at their mills is bought from farmers, who grow the cane on their own or leased land, generally with the company's financial assistance in the shape of advances on the growing crop. These farmers have the benefit of the company's experience in cane growing in Queensland. Experiments both in regard to agriculture and manufacture have for years been systematically carried out on the company's Queensland plantations, each of their mills being provided with a staff of two to four chemists and analysts.

To the fact, then, that the farmers do not avail themselves of the advice tendered them by the experienced officers of the company—the cane inspectors—it is greatly due that the results of such a system are not only not always satisfactory, but mostly unsatisfactory. Other circumstances naturally contribute towards the poor or irregular results.

In Bundaberg district I visited a number of ably managed plantations outside of the Colonial Sugar Refining Company's. Some of the land in that vicinity is similar in appearance and composition, according to analyses shown me there, to some of our best sugar lands. Growers in that district are however handicapped by a scant and irregular rainfall. They are aware, that by irrigation they could obtain heavy yields as in particularly favorable years up to 100 tons of cane were obtained from one acre. The difficulties in the way of adopting a system of irrigation were or are only financial and as the cost of such a system would in that locality be comparatively low, the water could be taken from the river, and the lay and slope of the fields is most favorable. The planters there hope to overcome the financial difficulties in the near future.

Some of the mills in this district are kept well up to date, though there are still a number of small, old-fashioned mills going. The majority of the mill-owners combined a couple of years ago to engage the services of a capable sugar-expert.

The finances of the plantations did not allow of very radical changes being at once made in their mills; but many savings have been effected by concentration of the work.

Some of these smaller mills have been stripped of their somewhat antiquated evaporators; their work is now restricted to grinding cane, the juice of which, after being limed very heavily (10 to 12 lbs. Cao per 100 gallons) is pumped to the refinery, pipes for this purpose being laid to distances of over five miles. At the refinery the juice undergoes a double carbonation process. While this manner of working undoubtedly entails a waste of fuel, and the action of such large quantities of lime on the juice for such a long time can hardly fare to do some damage, the system seems to suit local requirements well. Mills situated at too great a distance from the refinery send their juice similarly prepared in tank cars by rail.

It is the custom in most of the mills in Queensland to macerate heavily and all mills require and use other fuel besides bagasse. The advantages of this system of working are not quite obvious, particularly not to a visitor from these islands, where we are agreed that it is not profitable to buy fuel in order to be able to use more water for maceration. Before rushing in to condemn the Queensland custom however, we ought to bear in mind, that conditions there are entirely different, and that this heavy maceration is considered to be suitable by the chemical staff of the Colonial Sugar Refining Co., who are thoroughly acquainted with the peculiar local conditions.

In regard to the mechanical efficiency, the new powerful nine-roller mills as they are in use here are superior to those in use in Queensland. The principle of a compact nine-roller mill with short intermediate carriers, the whole driven by one engine has not yet obtained a footing in the colony. The objections brought against it, are first, that the relation of the speed of the mills to each other can not be varied, an objection, which does not appear to me to carry any weight, and second, that the imbibition or diffusion of the maceration water with the juice in the bagasse is less complete on account of the shorter time of contact. This is certainly the case; but the advantages in saving in steam, in reducing the time between expression and liming, and in greater cleanness, outweigh in my opinion the advantage gained by the increase in the quotient of diffusion.

From data, which I was able to gather, the use of spent

bagasse for filtering the clarified juice has proved very satisfactory. The system is at present being introduced into a number of factories. Where I have seen it in use, the juice was perfectly clear upon leaving the filter. The process and the appliances are very simple and inexpensive and the drawbacks, which suggest themselves at first, do not seem to in practice exist.

My time being very limited I did not make a stay in the Central Queensland sugar district (Mackay), but went direct to North Queensland. There I had an opportunity of seeing Hambleton estate, where a large number of very interesting experiments in cane growing are being carried on under the direction of the Colonial Sugar Refining Company's local manager.

As these islands had to do last year, so will Queensland probably have to solve a very serious labor problem. The planters have some reason to fear that the federal Parliament will abolish contract labor and exclude the South Sea Island labor, known in Queensland as kanakas. It is more than probable, however, that the Commonwealth will impose a fairly high duty on sugar, which would at all events partly neutralize the disadvantages of being dependent upon free white labor only.

A few remarks on the sugar industry on the island of Java, the land of cheap labor, will probably be of interest, though conditions there are widely different from conditions obtaining here. In the first plan there is a large difference in the tenure of land.

Only few plantations are carried on on private freehold property, the greatest part of the cane is grown on land rented from the natives for the period of one year only at the time. As each native, be his holding 10 acres or 100 acres, can let to the plantation one-third of it only, the sugar plantations are patchy and the cultivation is naturally more difficult and more expensive than on large areas of evenly planted cane. More attention seems to be paid to the cultivation in Java than either here or in Queensland, the fields there are quite appropriately called "gardens."

A crop of cane is never or only very seldom followed by another crop of cane. When the cane is cut, the land reverts to the native who lays it out into rice fields (sawa-patches) for irrigation. The crop of paddy is followed first by a crop of maize, beans, or indigo, then rice again one or two crops,

after which the land is made ready again for cane planting. As there are thus three to five different crops grown between every two crops of cane, the same piece of land will produce sugar only once in every three years. The age of the cane, when cut, is about twelve months. The yields compare favorably with the yields obtained here in districts dependent upon natural rainfall. The average yield for the whole of Java is above five tons per acre; the highest average for one whole plantation being seven tons per acre.

Formerly the tops from the cane cut for manufacture into sugar were used for planting in the same manner as is customary here, but the appearance of the sereh disease made an end to the continuance of this mode of propagation. Experience has shown the Java planters, that canes grown at higher altitudes are not liable to the sereh disease for at least one generation. In consequence of this practically all the seed used is grown on the hill sides, and the growing of seed cane has become an industry of its own. Such plantations are known as bi-bit gardens.

The appearance of sereh on Java has given a strong impetus to efforts towards producing new and hardier varieties of cane by cross-fertilizing the Cheribon and other cultivated varieties with Chunnee cane, a primitive cane imported from British India. Hundreds of experiments have been made at the East Java Experiment Station, and hundreds of new varieties have been produced. Most of them threw back to the primitive father, a great majority were canes inferior to the known varieties; but some resulted, which were an undoubted improvement on the staple varieties. Such plants were and are selected for further propagation on fields specially chosen for the purpose, and the seedlings from them are now supplied to the planters. A consignment of such canes will reach here in time for next planting season.

Results of these experiments are periodically published in the "Archief voor de Java—Suikerindustrie."

A very interesting feature of cane-culture in Java is the natural supply of fertilizers. Sufficient quantities of plant foods required for the cane lands—with the exception of ammonia—are brought down in the streams in the form of very fine slimes (slib), which have time to settle on the land during the time of submersion of the paddy fields. Java is thus no market for fertilizers except ammonia. Besides this we have to take into consideration the fact, that labor is cheap

and plentiful—wages vary, 10 cents U. S. currency would about represent the average—in order to understand how the estates can pay dividends, having to sell their sugar at about fl.7 per picul, or at a trifle above two cents per lb., 97 polarization.

The methods of cultivation in Java are very different from ours. Although the benefits to be derived from plowing are generally recognized, the plow is not to be found everywhere on the island; in fact, the area cultivated by the Reynoso system is larger than the area plowed. With the Reynoso system of cultivation, which has been introduced in Java from Cuba, the land undergoes the following treatment. Square ditches, about 18 inches wide and 18 inches deep are dug at distances from $3\frac{1}{2}$ to 5 feet. The soil taken out is hilled up on the ridges between the ditches. A little loose surface soil is sprinkled on the bottom of the ditch, and the seedling—generally one with three sound eyes—placed thereon and covered with very little soil.

At short intervals the ditch is gradually filled up by scraping down the soil from the sides, and when the cane nears maturity, some two feet of the stalk are covered in with soil. Where the ditches were, there are ridges and vice versa. By this method of planting the stability of the stalks is increased. The loss of water from the soil by evaporation is less than on plowed land. On the other hand, the development and action of the nitrifying bacteria must be handicapped by the exclusion of the air from part of the soil, and the cost of working the Reynoso system would be prohibitive in a country where labor is dear. It is however particularly suited to the condition of the soil after rice culture. This soil is very heavy and wet, and plowing would simply mould it into hard blocks. After drying out in the beginning of the dry season, the soil, so I am told, becomes so hard, that it is practically impossible to plow.

In cutting the cane planted according to Reynoso it is necessary to make a slight excavation on one side of the stool. A peculiarly shaped knife is then introduced into the excavation and the cane is cut at its very root. It is then tied into bundles and conveyed to the factory by bullocks or water-buffalos.

The cane leaves are not, as is the custom here, burnt on the ground; but they are used as fuel at the mill. Although the planters are fully aware of the considerable loss of nitro-

gen incurred by this proceeding, they are generally not in a position to plow the cane leaves in, on account of the peculiarities of the soils above referred to.

The cane sugar industry of the world is indebted to the two great experiment stations in East and West Java for many valuable discoveries. These institutions are, like the Honolulu Experiment Station, supported by the planters. While both stations are equipped for all the work coming into the province of such institutions, the one in East Java occupies itself principally with questions concerning the agricultural part of the industry, while the West Java station makes a speciality of the manufacture in its practical and scientific aspect. Uniform methods of analyses in sugar house work are used in all the factories belonging to the Handelsvereeniging, Amsterdam and the Nederlandsche Handelsmaatschappij. Each of these factories employs one or two chemists with one or two analysts able to do the routine work. The results obtained at the factories are compiled by the West Java experiment station and printed periodically for distribution among the mills. This system, although it can of course not be as complete and comprehensive as that of the Colonial Sugar Refining Co., who both manage and control their factories and plantations from their head office in Sydney, supplies the interested parties with valuable information.

The mills, all built in Europe, most of them on the continent are, like the mills in Queensland, inferior to ours in power, and the quality of the grinding is consequently below the quality of the work, to which we are accustomed here.

The boiling-houses, such as I have seen in Java, are thoroughly up-to-date, the machinery is of the best construction and of a perfect finish. As to the origin of engines, pumps, etc., they are quite cosmopolitan. Mills and boiling-houses are kept scrupulously clean, a factor, which may contribute to the good keeping qualities of Java sugars. The practice in Java is to boil but one grade of sugar. Crystallizers are in universal use, and the results obtained therefrom are very satisfactory. *All the sugar, before being filled into containers is dried in granulators and deterioration of sugar in transit is therefore practically unknown*—a fact which should be of interest to some of our planters, who frequently suffer losses caused by deterioration. Where there is a granulator,

it is not necessary to make the sugar very dry in the centrifugal. The capacity of the centrifugals is thus increased and a saving effected in their wear and tear. Women are frequently used in Java for work on the centrifugals. The sugar is packed solidly into *krandjangs* (baskets) holding about 600 to 700 pounds each.

Through the courtesy of the general manager of the Colonial Sugar Refining Co., Ltd., in Sydney, the department of agriculture and the department of immigration in Brisbane, I was enabled to utilize the short time I had at my disposal to the best advantage. Though the kindness of H. E., the Governor-General of the Netherlands Indies, I was enabled not only to get an insight into the sugar industry, but to become acquainted with the charming hospitality of the people inhabiting that lovely and most interesting of countries, the Island of Java.

ERNEST E. HARTMAN.

Papaikou, Hawaii.

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THE FRENCH SUGAR COMBINATION.

The most important of the trade combinations of France is that existing between the sugar refiners. They, in turn, are in a manner controlled by Mr. Czarnikow, a great sugar broker in London, who holds the Dutch sugar trade in the hollow of his hand, and through it the European refineries generally. A Marseilles broker tells me that he has among his effects a letter from a firm to which he had offered sugar on terms more favorable than those of Mr. Czarnikow, and which declined against its will, on the ground that to do so would subject it to the powerful broker's ill feeling and a refusal to recognize it for one year, that being his method of punishment at that time. The enlargement of the raw sugar areas which supply European refineries has somewhat diminished this merchant's power. The French refiners operate through a pool which fixes prices. The added cost of transportation naturally confines each refiner to a restricted radius of operation, and the practical effect of the pool is to make refiners independent within geographical limits. These limits are not laid down by contract. The output of each refinery is restricted in proportion to its producing capacity. The export trade also is proportionately divided. The Government pays bounties at the rate of 69 cents per 220 pounds, but limits this bounty to a total exportation per annum of 300,000 tons. The sum of

\$1,930,000 is thus annually contributed to the trade by the Government, and the total is distributed equitably among the refining companies, whose exportations do not go beyond the maximum upon which bounty is paid.

The average prevailing wholesale prices for loaf sugar for French consumption range from 100 francs (\$19.30) to 110 francs (\$21.23) per 100 kilos (from 8.8 to 9½ cents per pound), these prices comprising all Government charges. The duty or revenue tax collected by the Government amounts to 69 francs (\$13.31) per 100 kilos, from which about \$38,600,000 per annum are realized by the State. The price of sugar out of bond for export ranges from 32 francs (\$6.17) to 38 francs (\$7.33) per 100 kilos. The present legislation has been in force since 1893. In previous years, the duty was placed upon raw sugar on the basis of its saccharine properties and richness, and since the war of 1870 the taxation has about doubled; being now at its highest point. The trade in France includes eight refineries.—U. S. Consular Reports.

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SUGAR MANUFACTURE IN CUBA.

The Syndicate of the Sugar Manufacturers of France sent their special delegate last year to thoroughly examine the sugar question of the island of Cuba, and as his report is a very thorough one, we shall endeavor to give a general outline of the same. It is declared that the general fertility of virgin Cuban soil is very great and with the exception of Hawaii or Java, if has but few, if any, rivals; even on the most exhausted soils the sugar cane may be cultivated without being replanted and without manure, for three or four years.

There does not exist any system of rotation of crops. The only annual cost consists of a few hoeings. On the other hand soils that are planted with canes for the first time last for seven to ten years, and in some exceptional cases fifteen to twenty years. The production of cane per acre on soils that have been under cultivation for many years in the province of Havana and Matanzas is 14 tons, while on newly opened land in the south and east this reaches an average of 24 or even more tons per acre. The lands in the suburbs of Cienfuegos, the provinces of Santa Clara and Santiago, have recently been put under cultivation. The cost of cultivating 32½ acres of land that has been under cultivation for several years was as follows: Cultivation and plantation, \$1,300; cutting and transportation, \$600; cost of care given during development of cane,

\$35; cutting and transportation, \$300; 2d year cost of cultivation, \$350; cutting and transportation, \$300; 3d year, cost and cultivation, \$250; cutting and transportation, \$200 or a total of \$3,000. The average cost of the resulting cane is \$2.40 per ton with a small yield; this cost is lower on better soil. The cane to germinate requires moisture and heat; in Cuba the year is divided into two seasons, the dry and the wet. Upon general principles it is admitted that the sugar cane may be planted at any season of the year providing there is sufficient moisture in the soil. If the weather is favorable the crop from young canes may be harvested a year afterwards, but the yield is only three-quarters of what it becomes in subsequent years. Up to the present very few fertilizers are used. When the lands are semi-exhausted they remain fallow for a period of years, to be subsequently taken up. Diffusion is employed only in some few cases; from a technical standpoint this method is perfectly suited to the sugar cane, even allowing for the fact that sugar contains 10 per cent of fibrous substance, while the sugar beet contains only 5 per cent, and for the slightly different composition of the non-sugar; it is very probable that many years hence planters will abandon their cane mills and take up diffusion. The extraction does not exceed 65 per cent on an average, and in reality represents a loss of 65 per cent of the total sugar or 2 to 3 per cent. The residuum trash contains 7 per cent of sugar. The epuration consists of a single defacation and a filtration by filter presses, and sometimes by a mechanical system.

Some few factories use the Ehrmannite method. The massecuites and the molasses from first strike are worked in receptacles such as are used in the German Schutzenbach process. The capacity is about a ton of massecuite and a great number are required. They are mounted on wheels after being filled are allowed to cool for eight or ten hours for first strike, and two or three days for the second, and the cool cake is detached by compressed air. The residuum molasses from second grade sugars is sold to distillers; however, many factories are now doing their own distilling. Attention is called to the fact that the working of the after-products of first and second grade sugars has been abandoned in several sugar factories, owing to the fact that molasses may be shipped to the United States at considerable advantage. The Cuban planter extracts 3.3 lbs. of sugar testing 88° from a gallon of molasses at 50 per cent; on the other hand the American molasses boiler extracts an average of 4.4 lbs., and furthermore the duty for

second grade sugars entering the United States is comparatively higher than for molasses. The central factories built during the past ten years, are taken upon the whole, satisfactory, and have not suffered much during the war. The sugar cane mills, in general, come from the United States, and are generally worked by the Corliss system of expansion. The triple effects are English or American. Some few factories have dry air pumps with barometric condensers. The filter presses are German or French, very few factories using the mechanical methods of filtration. The turbines are mainly of the Weston or Hepworth types, which are suspended types and made in the United States. Very little attention is given to the economical method of utilizing steam, notwithstanding the fact that nearly all the factories consume coal or wood beside their trash or bagasse burning, in some exceptional cases the bagasses meeting the requirements.

Two weak points continue to exist in the Cuban methods, one the extraction of the juice and the other the working of the molasses and after-products. Some examples are given of the results obtained in the first plantation, commenced in December and ended in May and working with simple pressure, but with cane shredder; cane handled 56,700 tons, juice about 62 per cent, first grade sugar polarized 97; per cent of masse cuite 68.6; per cent of cane 8.7; second grade sugars polarized 89; per cent of masse cuite 33.1; per cent of cane 1.13. In the second factory the cane was worked by diffusion, 50,000 tons having been handled, which gave 4,878 tons of first grade sugar, testing 96 degs., corresponding to a yield of 9.73 per cent. and average sugar in cane 14 per cent. When the average was taken in ten or more factories visited, it was found that the yield was not more than 10 per cent. Cost of manufacture: For working 80,000 tons of cane by diffusion the cost per ton would be \$2.50, while in an ordinary Cuban sugar factory the cost is \$1 a ton of cane worked. It must be said that owing to very faulty systems of book-keeping as now existing, the exact costs are very difficult to get at. General expenses are very heavy; upon general principles, the factories of the island are located in centers at some distance from easy means of communication. The sugar factories themselves cost more to build than those of Europe. It must be noticed that a portion of the general expenses are reduced by the profits realized in selling the daily commodities to the hands employed, and in some cases this amounts to a clear

profit of \$20,000 per annum. The difficulties of transportation of sugars, etc., are very great. It is declared, when all facts are considered, that if after an interval of five or six years Cuba is able to manufacture her 1,000,000 tons of sugar, the American market will be closed for European sugars. Not only is it possible that the 1,000,000 tons may be made, but they may be exceeded. At the present time only one-tenth of the best land is under cultivation, and of 360 factories existing before the war there remained only 138 to run during the campaign of 1898-99; but it is thought 180 or 200 will soon be running.—Sugar Beet.

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SHORT RESUME OF THE BEET SUGAR MANUFACTURE.

By Sigmund Stein, Liverpool, Technical Sugar Expert and Technical Adviser for Raw Sugar Factories and Sugar Refineries.

The keen competition in the sugar industry of late years has forced the beet sugar manufacturer to do everything possible to economize and bring the working expenses down as much as possible. Great attention has had to be directed to every possible improvement, and the chemist and engineer have had to exert their faculties to the utmost. Yet it cannot be said that great and revolutionary alterations have been accomplished in the last decade, such as were witnessed in the seventies and eighties.

The beet sugar industry has established itself in many fresh countries, where in former years beet growing and beet sugar making were unknown. We see today that Sweden, Spain, Italy, Roumania, Bulgaria, Persia, and Greece have started sugar factories, and in a very short time some of those countries will not only cover their own demand for local consumption, but may even appear on the export market.

In this latter connection I must say that the present negotiations respecting the abolition of sugar bounties should eventually result in a definite understanding and a proper proportioning and regulation of the sugar production in the different countries. The various countries must devote their attention more to the local consumption, which they must try to increase, and thereby absorb the quantity which in former times they have devoted to export.

Of late years great scarcity in the supply of fuel has been felt. This scarcity, and the high price of coal, have induced

manufacturers to economize the consumption of steam as much as possible, and I must say that in this particular direction great improvements have been made. Several factories in Russia and Roumania are now using their cheap raw petroleum, applying this instead of coal in the manufacturing. In this respect great improvements have been made for finely dividing and distributing the petroleum in the furnaces so as to obtain a perfect combustion. There are many systems of these petroleum injectors on the market, every one of which, of course, claims special advantages.

Improvements have been made in the direction of saving manual labor as much as possible and replacing it by mechanical appliances.

In late years the cost of labor has nearly doubled. This may be said of nearly every country. But by these improvements, and in spite of the greater cost of labor, the cost price of sugar is now lower than it has ever been.

Nearly everywhere we find in use canals for conveying the roots from the silos and from the beet stores into the different factories. This way of carrying is the cheapest, easiest, and the cleanest. While on the way from the silos to the factories the roots are cleaned in these canals. They can work in any kind of weather, have a slight fall, and are supplied with the waste water from the factory. I may say that these canals are in their way one of the greatest improvements which have been made in the last few years.

The washing of the roots is done in washing machines, which in principle are the same as those in use twenty years ago, but one improvement may be mentioned, which is, that the washing machine is now made with automatic ejection of the washing water, while nearly all washing machines are provided with stone catchers.

The slicing machines are not made much bigger than they used to be, but are adapted for producing the finest slices to get the best result in the diffusion. By this a smaller quantity of juice is produced, which has the greatest quotient of purity, and this is done at a low temperature. Nearly everywhere slices are delivered from the cutting machines by transporters (either belts or racks) into the diffusors.

Now-a-days nearly every factory possesses an automatic scale for weighing and registering the roots which have been delivered and worked.

The diffusors have been very much improved. The batteries consist of 12, 14 or 16 vessels, but the capacity of these vessels

varies very much. The heating is done by injectors or calorifiers. The emptying of these diffusions is effected at the side or at the bottom of the vessel, automatically or not. The closing of the diffusors has also many varieties of form.

Several factories have increased their capacity so much that they have been forced to put another battery alongside the first one, in order to cope with the increased work. Patents have been taken out for emptying the diffusors by compressed air.

The slice presses have received much attention of late years, and many engineers have improved them so as to bring the slices to the highest content of dry substance.

The slice drying has also undergone great improvement, and the slices brought to the market have a very clean appearance, and are not so burned as they used to be in former times, and give a better analysis. In this respect the amount of fuel per cwt. of dried slices has been very much reduced against former times. These dried slices find a ready market, and are preferred by the farmers to any other kind of feeding material.

Coming back to diffusion, it should be mentioned that nearly everywhere fore-heaters are applied. These are vessels which are arranged in the form of a battery, into which the juice is pumped at a pressure of $1\frac{1}{2}$ to 2 atmospheres, and the juice is carefully warmed without any risk of the small pipes in which it runs being choked.

Saturation has not undergone any radical change. As in former times, in many places lime milk is used, but the quantity of lime is now properly measured. Many factories employ dry lime saturation. Each of these two processes has its good and bad side. The saturators have a rectangular or round form, but the carbonic acid pipes have been altered so that they admit of being cleaned without the man having to enter into the saturators.

Great attention has been directed to the lime-kiln, as it is necessary for good saturation to have a rich carbonic acid gas, and also because coke rose to so high a price. Experiments have been lately made for using gas coke instead of the old form of coke, and with great success. Many factories practice two or three carbonic acid gas saturations; others use two carbonic acid saturations and one sulphurous acid saturation. Experiments have even been made to improve the saturation by a quadruple process.

The filter presses have as many systems as makers. Nearly every engineering firm has its own filter press. These filter

presses are made nowadays so as to use as little washing water as possible, and to save filter cloths. The slime is emptied from the filter presses into little cars, or sent away by a pipe into the yard.

The thin juice is evaporated in many new systems of evaporators. We find today not only double effects, triple effects, quadruple effects, but even quintuple effects, and modifications of these of great variety.

The high price of fuel has everywhere forced manufacturers to economize steam as much as possible. It would take too long to describe the special kinds of evaporators. In this instance I may as well say that there are as many evaporators on the market as there are engineers, as every one of them makes a special kind, and each claims his to be the best.

Many factories filter the thick juice before it is boiled in the different kinds of vacuums to grain. Attention is directed towards the production of a strong, hard grain, while at the same time the yield in first jet is as high as possible. The reason for the latter is that most of this sugar is washed in centrifugal machines by steam, liquor, or water, sugars for direct consumption being produced. In this way, direct from the raw sugar, a white sugar ready for consumption is made, which does not differ in any respect from the refined sugar made with charcoal or any other process.

Most factories now employ large mixers placed under the vacuum pans, instead of the little boxes which are still to be found in a few small and old factories. In this respect, also, I may say there are almost as many different kinds of mixers as there are makers.

Great improvements have been made with the different pumps and engines. Several factories have been induced to adopt electricity as the motive power, and are driving their factories by this agency. Of course, there are a great many points for and against it, and I cannot go on to discuss the advantages of electrical motors as compared with the old system, because it would exceed the scope of this rapid survey.

Great attention has been paid of late to the working of the after-products. In former years, after the first working was finished the factory was closed, and in a short time opened again; the second product was worked, and after this was finished the factory again closed, reopened in a few months, and a third product was worked. The residual syrups running from the first product were boiled to string and deposited in large tanks situated in some special part, or in the basement

of the factory. In these receivers the sugar crystallised (and caramelised!) and when this syrup was "ripe," the masse cuite was centrifuged, and the second product made. The syrup from this second product was boiled to a third product, and so on. Refiners made as many as five products. This old way of working has changed, and a good dozen of inventors have taken out patents for doing away with this old way, and the so-called "after-campaign," which was extremely inconvenient and costly. But in studying all the different patents for treating the after-products it is very difficult to find an ultimate radical difference. They are nearly all similar, they accomplish the same end by a slightly different method, and it is only the fancy of the manufacturer that gives preference to one as against another. The idea is perfectly correct and the underlying principle of them all is that the syrups are eventually kept in motion by which the forming of crystals is facilitated.

As already mentioned, there are scores of such processes, amongst them the best known are the process of Stenzel, Loblich, Zscheie, Claassen, Bock, Wulff, Freitag, Grosse, Sachs, Abraham, &c. The inventors use special constructed vacuums and special constructed mixers, and employ air or steam which are injected. Some make use of small sugar crystals which are thrown into the syrup in motion. Other inventors attain the same result by careful boiling at certain temperatures, and treating the syrups afterwards in malaxeurs. As mentioned, the main principle is a good one, and every manufacturer can very easily make a process of his own and treat the syrups according to his ideas in the way most suitable to his manufacture.

In former times molasses was mostly used for distilling purposes or for the extraction of the sugar by one or other of the known molasses extraction processes. Now-a-days a great quantity of molasses is mixed with different feeding stuffs or neutral substances and sold as molasses fodder. I counted lately not less than 60 such substances which can be mixed with molasses and used for the manufacture of molasses fodder.

A considerable quantity of molasses is still utilized in extracting the sugar from them. There are many patents for extraction of sugar from molasses. They employ either lime, barytes, stronia, or lead. Of course it would lead too far and exceed the limits of this summary to deal with and criticize

the different molasses extraction processes, but I will reserve this for my next paper on the subject.

It is possible to make in a raw sugar works crystals, cubes, and loaves, of the finest quality. The use of charcoal has been entirely abandoned in such works, and even many refiners do not employ charcoal at all. It is very difficult to say now-a-days where a raw sugar works ceases and a refinery commences. By careful working and by the use of certain appliances it is possible to boil from the raw juice fine crystals, and by special treatment it is possible to make in this way loaves and cubes. The principal thing is the treatment of the juice and a proper mechanical filtration. A great improvement has been made with the centrifugals for drying loaf sugar. These centrifugals are made now for loaves of any merchantable weight.

Cube sugar is made according to different methods, and there are again many patents relating to these methods. The pressed cubes however, being the cheapest and the easiest to work, are gaining ground more and more from day to day. I have seen pressed cubes lately which were of such good appearance that it was very difficult to distinguish them from cast cubes. I think in time to come the great distinction between raw sugar works and refineries will cease entirely and there will be only one kind of works, namely, such as make refined sugar direct from the raw juice, either beet or cane. But this may come about only slowly in certain quarters.—*Int. Sugar Journal.*

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THE PHILIPPINE HEMP INDUSTRY.

Among the chief industries in the Philippine Islands is the gathering and export of hemp, *Musa textilis*. Manila hemp is known the world over for its fine quality and its value for making all kinds of rope, from the biggest hawser down to the finest piece of twine, and it would be very much in order to devote a little of our space to this important feature of Manila's commerce.

"Manila hemp" is the name invariably used by the merchants of England and America to distinguish it from the Russian and Indian hemp, which is much inferior. In the Philippines, however, it is not regarded as a product of Manila and districts, but chiefly of the Southern islands, and it is called "abaca" with the accent on the last syllable.

The hemp trees of the Philippines have been tried to be in-

roduced in Borneo and India, but without much success. The trees grow best on the Pacific slopes of the southern islands. South Luzon furnishes the best quality and greatest quantity. The roots of the plants cannot exist in damp soil; volcanic soil, where the ground is dry, and plenty of moisture overhead, is essential to getting the best results. Here large plantations are found among the hills with the hemp trees in different stages of growth. They require little cultivation; once a week the native cleaner or gatherer goes through the plantation and does the little weeding that is necessary while in performance of his duty of cutting and stripping the trees.

The trees are planted from suckers and grow to a height of ten feet, and from five to seven inches in diameter. In appearance they appear to an unpractised eye like the banana tree, and if these trees were allowed to grow five or six years they would develop a fruit something like a plantain; it is said by some that this fruit is poisonous.

When the tree is three years old, then it is the proper time to cut it down and strip it of its fibre. This stripping is a most difficult and important point in the production of hemp and requires great experience. The native cleaner, as he is called, goes up into the hill armed with his bolo and a bag of rice. He enters the plantation and glances to right and left as he walks along. Experience has taught him to tell at a glance if a tree has reached the age for cutting. One slash with the bolo and the tree is cut down close to the roots. The first thing he does is to plant a cutting or shoot in close proximity to where the tree grew. This is invariably the rule, that when a tree is cut down another is immediately planted in its place, so there are at all times trees in different stages of development. As soon as this is done he strips the plant of its leaves and commences on the long stalk eight or ten feet in length. He strips off the extreme outer skin and then commences the real work. In the centre of the stalk is a stout pith, and around this grow alternate layers of fibre and sappy vegetable matter. These layers of fibre must be carefully stripped off the stock at once for fear of them rotting the fibre. The cleaner in a couple of minutes has cut a small bamboo tree and made a rough bench. With a bamboo strip fastened to his knife and that in turn fastened to his foot, he stoops over to the ground in front and then makes a full backward sweep as far as his arms can reach, stripping a layer of fibre which he throws off to one side. This is repeated until

the fibre is all taken off, and after spreading the strippings on the ground to dry in the sun, he continues to repeat the work in another spot wherever he may find a tree in the proper state of maturity. The work of stripping is heart-breaking and causes many a lame back; even the native who is accustomed to the work finds it no sinecure. A full tree will yield about one pound of fibre and a native can clean fifty pounds in a week. The length of the fibre is from six to eight feet.

The natives are exceedingly independent and work as long as it suits their convenience. When a cleaner has got what he considers enough fibre cut, cleaned and dried, he ties it up and takes it down to market, where he sells it to the middleman and receives in return the market value of the fibre. The plantation owner receives one-half this remuneration and the native keeps the other, and this is the only time the plantation owner figures in the whole transaction, i. e., when he gets his half. He simply watches to see that he gets his share.

In the hemp ports, representatives from the business houses in Manila buy from those middlemen. They are either Spanish, Chinese or native dealers, who collect the hemp and barter with the native cleaners, using rice as the standard of exchange.

GRADES.—Ordinarily, the hemp arrives here classified according to grades by a middleman, but sometimes it is sent here to be classified and the experienced eye of the merchant spots at once all defective or injured fibre. The quality depends a great deal upon the original cleaner and the state of the weather at the time the tree was cut.

To turn out the best grade the cleaner requires to be very careful in his stripping and have the fibre dried at once, whereas, if allowed to stand awhile, the fibre loses its fine color and some of its strength. Hemp is graded according to fineness or coarseness, color, length of fibre and its tensile strength. The latter depends greatly upon the age of the tree. The color and coarseness show the quality of the hemp and this depends, as mentioned above, wholly upon the cleaner.

VALUE.—The value of hemp varies. It has been known to be as high as £60 per ton and then again as low as £14 sterling. The price fluctuates continually, owing to the war and the political situation in the Philippines. The average rate per long ton, however, is about £25 or £30 sterling.

There are between 800,000 and 1,000,000 hales of hemp produced and shipped from this island annually. The United

States, acting as a centre for South America, Cuba and Canada, and England as a centre for Europe and Western Asia, take the bulk of the trade in about even quantities.

The bales are packed by both hand and steam presses, and weigh about 28 pounds each. They are thus conveniently handled. About half a dozen of the shipping houses here do the bulk of the export trade and, perhaps, forty steamers are utilized in the carrying of rice to the ports and a return cargo of hemp to Manila. The handling of the business requires years of experience and a long residence in the country, to be successful in coping with the business methods of the wily Asiatics, both Chinese and Filipino.

We all remember how in visiting the owner of an orchard he takes us through his fruit preserves and can tell every grade and variety of apple tree. They appear to the unpractised eye to be all alike. It is the same with the hemp plantation. There are many varieties and the natives showing a visitor through the groves point out the different grades of trees, giving its native name and whether the quality is better or inferior to the ordinary. There are residents here in Manila, foreign as well as native, who from long experience in handling hemp, can at a glance judge which ports certain bales of hemp have come from. It is indeed a great business and cannot be learned in a day.

From the outer layer of a properly matured tree comes the finest of fibre, and if this is carefully cleaned and dried, it is sometimes used by the natives to weave into cloth. They mix it with silk and make a sort of Indian muslin, in fact it makes the finest of hemp cloth. Some of the natives in the hemp growing districts make coarse cloth to wear, while others make fishing nets, the fibre being exceptionally good for this purpose, as it is so strong.—Manila Times.

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SUGAR PROFITS AND DIVIDENDS.

Some months ago the management of the American Sugar Refining Company reduced the dividend on its common stock from 3 per cent quarterly to $1\frac{1}{2}$ per cent, thus cutting down the dividend rate on the security from 12 to 6 per cent per annum. Since that time a marked change has taken place in the condition of the sugar-refining industry. There has been no formal combination of the American Company and its competitors, but the indications have all been that the trade war

is now a thing of the past. The formation of the National Company brought the new plant created by the Messrs. Doscher and some other outside refinery under the control of a management which, if it can not be described as friendly to the sugar company, is certainly inclined to work in harmony with it and on a profitable basis. In the same way the sugar-refining business of the Messrs. Arbuckle seems no longer to be conducted for the purpose of depriving the old trust of profits from its operations. Trade conditions also have been favorable to the sugar-refining industry. Exceptionally large demands for refined sugar have permitted of successive advances in prices for the various grades of the article until, as has been already pointed out in these columns, the manufactories have all been running to their full capacity, and have evidently been making instead of losing money, as it is generally believed they did during the time that the sugar-trade war was in full progress. The margin of profit upon refined sugar is a small one, but its recent amount, taken in connection with the extent of the meltings, leaves no doubt as to the substantial character of the gains which have accrued to all the concerns engaged in that branch of industry.

More or less has been heard of late concerning the limited supply of raw sugar now held by the various refineries and the possibility that before a new crop of raw came in large quantities there might be a serious deficiency in the supply, leading to a curtailment of production of refined sugar, or perhaps a temporary shutting down of the refineries. This was, in fact, made the basis for more or less of an exhibition of stock-market bearishness in regard to American sugar common stock, though that erratic and highly-manipulated security failed to decline very much under pressure exerted on it by the speculative bears, and, in fact, displayed the presence of buying support at the weak intervals. In sugar-trade circles it has been urged that the alleged shortage in the supply of raw sugar was imaginary and merely represented the ordinary reduction of supplies on hand which occurs between seasons. Large supplies of raw, it is stated, are on their way to this country, and there will be no cessation of activity on the part of the refineries, except such as may be rendered necessary for repairs to the plants or by a further slackening of the consumptive demand, which, though by no means as large as it was during the height of what is termed the fruit-canning season, is still somewhat in advance of the customary require-

ments at this period of the year. Assurances of this character would seem to have been effectual in continuing the support given to American sugar stock, which remained steady and seemed to be the object of buying on all concessions.

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*HOW THE DEPARTMENT OF AGRICULTURE ADDS TO
MATERIAL WEALTH.*

In the July number of the Rural American, Mr. George William Hill, Editor of the United States Department of Agriculture, interestingly reviews several classes of work by which this Department, in the exercise of its executive functions, has added directly to the material wealth of the country. "Just as agriculture," the writer says, "is more than any other industry the basis of our National prosperity, so, of all our National Departments, that of Agriculture can be shown to be foremost in adding indirectly to the wealth of the country. More than this, however, it may be shown to add steadily and directly to the Nation's wealth, and that in numerous ways and to an extent which the average American citizen does not begin to appreciate."

To illustrate this, Mr. Hill cites many well known examples by which the aggregate product of our agriculture has been increased and diversified directly through the instrumentality of the Department of Agriculture. The material wealth of the country has been greatly augmented by the introduction of Fultz wheat, sorghum, rust-proof oats, alfalfa, and various forage plants. The Bahia, or Navel, or seedless orange, a source of almost incalculable wealth to the Pacific slope, owes its adoption in the United States solely to the Department. The ravages of the scale insect which at one time threatened to annihilate the orange industry of California, was finally checked through the introduction from Australia, and the propagation in California, of the Australian lady-bird, the most active destroyer of scale insects. A later service to the California fruit-growers has added 150 per cent. to the value of the fig crop by the introduction of an insect which fertilizes the Smyrna fig with the pollen of the celebrated capri. Of the \$400,000,000 which is estimated as the amount of damage threatening all the crops of the United States through insect pests, it is believed that fully one-fourth is averted by means of remedies and preventives discovered by entomologists of the Department of Agriculture.

The introduction of an improved variety of Japanese rice

has already added \$1,000,000 to the value of our domestic rice crop.

A red winter wheat from Russia, the Builova, has been so successful in Kansas that already private parties are arranging to import seed.

The increased production of vineyards through the treatment with fungicides recommended by the Department has been attested by numerous vine-growers.

In the case of potato rot, an increase was found in the yield of the treated over the untreated of 25 to 50 per cent., and at trifling expenses.

The extirpation of contagious pleuro-pneumonia of cattle was the result of unceasing effort on the part of the Department authorities. The value of this service to the country is inestimable. Likewise, a saving to the country of from \$5,000,000 to \$6,000,000 every year has been effected through the prevention of the cattle disease, known as blackleg, by vaccination. Other diseases of animals are being investigated, and, in many cases, serious losses have been prevented, while reduction in maritime insurance on live cattle, as the Department's supervision and control of cattle-carrying vessels, saves to shippers over \$2,000,000 a year.

Investigations of soil conditions have shown, among other things, how to reclaim and devote to profitable use hundreds of thousands of acres in arid regions which are now useless.

Improved methods have been introduced among the sugar growers of Louisiana by which the value of the cane sugar crop was greatly enhanced; and, in the promotion and encouragement of the beet sugar industry, the Department has also played an important role.

Mr. Hill concludes by saying: "It would be easy to greatly multiply these instances of direct saving or of money returns resulting from the various lines of work undertaken by the Department under the organic law which authorizes, and indeed requires, the Secretary of Agriculture to acquire and diffuse, by every means at his command, information of value to agriculture in the most comprehensive sense of that term."

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TO LIMIT INHERITANCE.

At the recent annual meeting of the New York State Bar Association, President Walter S. Logan addressed the gathering on "The Limitation of Inheritance," which limitation he would place at ten million dollars. He said:

"My subject has nothing to do with the right of a person to accumulate all he can in his lifetime, and to spend his accumulations as he will. It relates only to the transmission of his accumulations by will or inheritance after his death.

"A live man's claim to live in the house that he has built has its foundation in the best of logic, but the claim of a man of the right to live there after he is dead, or to dictate as to who shall continue to occupy it when he can have no more need of it himself, has no such clear, logical basis. The earth is barely large enough for the people who are living on it now. If it is to be incumbered by the corpses or the spirits or the testaments of all who have gone before, live people will have a poor show."

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DR. MAXWELL'S PLANS IN QUEENSLAND.

In a report covering an outline of his early operations in connection with the sugar industry, Dr. Maxwell, the recently-appointed director, says that he intends at once to proceed to Bundaberg, the proposed headquarters for laboratory investigation. Arrangements will be matured for building and equipping at that place suitable laboratories, which shall be ready for occupation in January or February. After maturing plans for laboratories in Bundaberg, the director proposed to proceed to Mackay. In the early part of December the first assistant chemist is expected to arrive. He, with any junior assistants, will also go directly to Mackay to commence and continue work in the small laboratory belonging to the Government in that place, and until the laboratories in Bundaberg are ready for use.

The immediate work will be confined chiefly to soil examinations. These will be conducted as follows: Dr. Maxwell will visit and inspect the lands of the cane-growers in the Mackay district, taking samples of respective soils and recording all data of place, environment, and past treatment. The samples will go directly to the laboratory, where all data bearing upon the chemical nature and requirements of each soil will be obtained by analysis according to the instructions and methods of the director. By this combination of inspection in the field and analysis in the laboratory, side by side, within a relatively short time, data will be at hand for practical use in the field. Having furnished material for the laboratory, and having gotten the chemists to work at Mackay,

the director will return to Bundaberg to supervise the completion of the laboratories. When they are completed the chemical staff will be transferred to Bundaberg.

The above outline of initial work deals with the practical inspection of the lands of the cane-growers and the laboratory inspection of their soil for the purpose of giving direct advice in the field. Simultaneously the directors will make selections of lands for use as experimental fields, for the purpose of studying and demonstrating matters such as cultivation, fertilization, rotation, varieties of cane, irrigation, and other allied questions. Dr. Maxwell thinks the above is enough to indicate the character of the work to be immediately entered upon.

The outline of work was drawn up with the express purpose of obtaining data and results that can be at once made use of in the field. "It must, however, be apparent to any one who has the most elementary grasp of the work embraced by this undertaking that time will be required to investigate the great problems in our path, and to reach the more substantial and permanent results. The situation, as it is found today, is the result of want of knowledge and mismanagement during a course of many years, and it cannot be changed and remedied by a word, or by some instant, subtle action, which may seem possible to such as do not think. The task and end we have in view is nothing less than the undoing of the results of what has taken years to do. These results have been calamitous, and the remedy must not be looked for and counted as the work of a day.

Dr. Maxwell goes on to say, concerning the manufacturing side of the sugar industry, that investigations will follow after the establishment of the system of work for dealing with the soil and its increase of production. The inspection of the manufacture, however, will embrace, in addition to the ordinary routine of sugar-house control, exhaustive investigations of cane juices, normal and diseased, and of the action of juice impurities (especially of diseased canes), and different modes of juice extraction, upon the economic recovery of the sugar. These investigations will be carried on under the director's instructions, with the assistance of a physiological and bacteriological chemist, and will be a special part of the whole subject of sugar-house economy.—*Courier*.

CANE DISEASES IN JAVA.

SEMARANG, DUTCH EAST INDIES.

Editor Louisiana Planter:—The General Syndicate of Sugar Manufacturers in Java, a body where almost all sugar planters and makers are represented, held their annual congress or meeting lately. Subjects were treated there and the discussions as well as the festivities, which followed them, were a complete success. One of the chief points was the discussion on the newly observed cane disease, called "dong kelars siekte" or root disease.

This disease is spreading rapidly and comes back every year in the attacked fields. The affected canes wither in a few days' time already as early as March or April, also in the full wet season and, on examination, the roots appear deformed and rotten; the root end of the stalk is dry, lignified and shows hollow spots. The real cause of the disease is still unknown but in the congress it was resolved that Mr. Ramerling, botanist of the West Java Experiment Station, who gave a scientific diagnosis of the same, should visit all affected spots and try to trace the cause of the disease in order to find a remedy against it.

Other subjects discussed were the selection of sugar cane by chemical analysis, already referred to in one of my former letters; next the advantages and disadvantages of Ross cane-cutters and of cane shredders; the cause of the inversions of sugar during transport, steam pipes, transport by rail on estates, etc.

The congress appointed a commission charged to examine an invention, made by one of the members, aiming at the separation of molasses and clarice in curing first sugars, and another to examine the possibility and the opportuneness of adopting the metric system in all measures of machinery after the regulations of the Zurich International Congress of October 3-4, 1898.

The success of the propagation of cane by seed has been very great in Java, and one estate (Kremboeng estate near Sidhoardjo) is to be planted this year entirely with descendants of seedling canes. It ought, however, to be understood that these estate's canes are not sowed just as one would sow corn; for they are planted from tops just as usual, with the only difference that the parents or ancestors have been raised from seed. It would not be feasible to plant a whole estate fresh from seed, as it would take too much time and trouble.

besides that, owing to the great variability of the seedlings, a bad crop could rather be expected than a good one.

There still exists much misunderstanding as to the real purpose of sowing cane in Java. Our rich and beautiful so-called "Black Java cane" (called "Cristalline" in other countries) yields heavy crops of rich canes, having a pure juice, it is able to stand both drought and moisture and may be kept on the field for months after its ripening without fear for alteration. Its only drawback is its liability to be attacked by the dreadful "Sereh" disease and it costs our planters every year huge sums of money to raise fresh, sound tops. In order to endeavor to save that money several people have imported other varieties from other countries, hoping to hit upon one that could combine the excellent qualities of the Black Java cane with an immunity against "Sereh," which could be propagated by the tops of the canes cut for the mill as is the method in all other countries, without needing to have recourse to the expensive fields for planting material. This way of obtaining new varieties was rather expensive, unreliable and moreover very dangerous. First of all it took a lot of trouble to obtain a few specimens of cane from distant countries and next even very famous varieties proved to be totally worthless in Java. Several times the Lahaina cane, which is claimed to yield as much as eight tons of sugar per acre on the best land in Hawaii was carried over to Java but in every instance was quite an inferior cane under the conditions it had to grow here, remaining small and poor in saccharine content.

Finally the importation of foreign canes is apt to bring along the introduction of new diseases or new pests as yet unknown here. As new diseases or new parasites have their maximal noxiousness in the first time of their appearance, when the natural enemies, which kept them in check in their native country, are still lacking the danger exists that an imprudent importation of a new variety of doubtful value will mean destruction to our industry.

In order to avoid all these evils it was tried to raise new varieties in the country itself, thus saving the expense and trouble of importing them and preventing the danger of bringing in new diseases or animal pests. By cross fertilization of parents having either a high saccharine content or a heavy weight or an immunity against diseases it could be expected to raise new varieties of canes combining the good qualities of the parents, without any risk and heavy expenses.

First of all the proper way of sowing cane had to be examined and the best methods of raising and nursing the young plants and next the hereditariness of the qualities of the new variety had to be stated in its scions obtained by annual propagation. The results surpassed expectations. Almost every variety had fertile pullers and by crossing rich canes with strong ones quite a host of new varieties sprung up, which were rigorously tested. Canes remaining small or thin, or having a poor and impure juice, were rejected, as well as those that were attacked by Sereh. From several thousand of young plants only some few excellent varieties were kept and propagated in the usual way by planting their tops.

One of our best planters, Mr. Mogueette, of Krem, Cveug estate, succeeded in raising a lot of good new varieties. Some of these ripen early, others late, some require a moist soil, others prefer a dry situation; some of them like a stiff clay, others only thrive in a loose soil, etc. Now Mr. Mogueette picked them all carefully and has every part of his estate planted with tops of those varieties of seedling canes that suits them best. Mr. Mogueette still goes on sowing cane seeds, but only with a view to further extend his fine collection of superior varieties, whilst his fields are exclusively planted from tops.

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Another shipment of pineapples from Jamaica has been put upon the London market, and has caused a stir in Covent Garden. They consisted of over 500 packages of fruits, and they were in very fine condition when they came to hand. This forms the second direct shipment into this country, the first parcel being sold at prices ranging from 1s 6d to 2s 6d per pine, and the first announcement of which was published in the *Globe* at the time. From an interview with one of the largest importers in the trade, it would seem that the direct trade in pineapples, between Jamaica and London, may now be considered as established on a business footing.—*Globe*.

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The Beet Sugar Gazette has published the results of a comparative study of the relative cost of producing cane and beet sugar. The average shows that it requires twenty tons of cane to produce 1.75 tons of sugar, at a cost of \$62 per ton; of beet ten tons to make 1.07 ton, at a cost of \$53.50 per ton. There is a great difference in results as reported by various coun-

tries. In Java three tons of cane sugar are obtained from thirty-two tons of cane; in Porto Rico, one ton from ten tons of cane; in Spain, 0.9 ton of sugar from seventeen tons of cane. In Russia, 1.8 tons of beet sugar is made from 7.2 tons of beets; in Germany, 1.2 tons of sugar from 12.5 tons of beets.

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A LATE NAVEL ORANGE?

Now that California has facing it the problem of marketing more oranges by far than the United States has ever consumed in one year, a condition which will be presented at a very early date, if not during the next season, the need of so producing fruit that it will be marketable throughout the year is becoming almost imperative, says the L. A. Herald. That it is possible for horticulturists to pick oranges during every month of the year if varieties are selected with that end in view, is evident, but at the present time the latest varieties of oranges are not so delicate in flavor as the navel, and consequently people all tend to grow that variety of fruit. That no one seems to have yet set for himself the task of producing a late navel orange seems rather remarkable. This is a subject which the writer has referred to on several occasions, but it will stand repetition, for it is of great importance. There are navel orange trees growing in the same orchard in Southern California, side by side, under the same conditions, and one tree each year ripens its fruits six weeks earlier than its neighbor. It is by no means improbable that if a careful search were made through Southern California navel orange trees could be found which differentiate nearly or quite two, or even three months, in time of ripening. It would seem to be acceptable without argument that the horticulturist would have very much to gain by having his orchard divided between early and late navel oranges, and if it could be found that there were three months' difference in time of ripening, there would hardly be a month in the year when navel oranges could not be sent out of California in prime condition. While horticulturists are studying the habits of their trees, this is a point which should be closely studied.

Alaska boasts that it will add \$40,000,000 of gold to the wealth of the world. Secretary Seward's \$7,000,000 purchase, much ridiculed at the time, was a mighty fine investment, no matter from what standpoint it is viewed.

How to control the San Jose scale is told in Circular No. 42, United States Department of Agriculture, Division of Entomology. This is of interest to every California grower of fruit. Get it.

The United States, says Chauncey M. Depew, with 3,000 miles of ocean from European governmental complications, will never take a militant part in the rivalries, jealousies and wars of Europe. These very miseries, the wars, make the United States every year stronger as a financial factor, and will, I believe, make New York the financial center of the world. Up to two years ago the European cabinets took no interest in American diplomacy and finance. America was regarded as a granary in times of poor harvest on this side, and as a dumping ground for surplus population. Now, no Cabinet in Europe makes a move without considering what is the position of the United States in the matter.

Is Russia to control Asia? asks a writer in the *Cosmopolitan Monthly*, who gives a very clear statement of the advance of Russia southward from the Caucasus and the Siberian line until her armies are encamped on the northern border of India; a port has been secured on the Persian Gulf; Northern China has been brought under the Czar's influence; railways into Chinese territory have been built; "half a million soldiers are stretched along her frontier, with fully 1,000,000 horses and camels to mount them and supply pack trains for carrying provisions and forage across the desert. Russian influence is paramount at Teharan, Herat, and Peking. In another decade French and Russian military lines will bound India." The writer declares that America is the unknown quantity in the far East. By leaps and bounds her trade is increasing, while that of England is declining. Active American business men are penetrating to the farthest corner of China and Siberia.

:o:

SONG OF THE SUGAR BOILER.

[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 in-

served more as a curiosity than for any intrinsic merit. Editor.]

Hi! poets all and men of note,
Who drive the pen or tune the throat,
Come, sing of one on whom all dote—

Sugar!

When, through the house a din is made
To fill all ears by crying babe,
What is it quells the little jade?

Sugar!

What various forms of pills and sticks—
Of candy rings and candy bricks—
In which the rogues so deftly mix—

Sugar!

The silly youth that goes to school
Consoles himself beneath the rule,
With painted plugs of—O the fool!

Sugar!

What mighty power so softens strife,
So sweetens all the ways of life,
E'en almost soothes a scolding wife (?)

Sugar!!

What makes big water wheels to go
And bids great streams of water flow
Where'er it will—whether or no?

Sugar!

What fiercely wakes the glowing fire,
Makes mighty engines spend their ire,
With heavy clank and din so dire?

Sugar!

What forms the everlasting talk
In parlor fine and rural walk—
What, but thy towering, magic stalk?

Sugar.

What opes up beauty to the sky
From Rose Ranch down to Atoai
And makes Hawaii look—O my!

Sugary.

What whitens all the sea with sails
About these isles, and fills the mails—
Aye, what alone just now avails,

Sugar!

And can I ever cease to be
A zealous follower of thee,
Who art so very sweet to me?

Sugar!

Oh no, the thought I cannot bear,
For sugar making's all my care,
Moreover thou dost pay my fare.

Sugar!

Wailuku, Maui, April 19, 1864.