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**THE SUGAR TRADE.**—Latest advices from New York quote Cuban centrifugals at 4 5-16.

The market for raw-closed lower and quiet. The demand for refined is light, and, while the list is unchanged, the trade is demoralized and favored, and large buyers gain concessions. There are no signs of a termination of the fierce competition.

Willet & Gray's Statistical says: "A year ago the American Sugar Refining Company changed their policy to closest competition necessary for maintenance of their business at its fullest proportion of the consumption. This policy is understood to be for five years, if necessary. At the end of the first year they retained their business at the expense of profits, but stockholders received their dividends from surplus. The second year starts with their largest competitors closed for lack of profits, but with even closer competition with those who remain, and with not the smallest sign of any lessening of this competition, and with losses for the entire year now entered upon.

Last summary of the statistical position, as reported by Willett & Gray, shows stocks in the United States and Cuba together of 219,708 tons, against 205,329 tons the previous week, and 157,985 tons last year—an increase of 61,723 tons over last year.

The increased and increasing demand for cane sugar in the countries of production in the far east has also become important as it checks exportation, though it must be admitted that, so far as Java is concerned, the prices of the last crop are reported to have been so satisfactory that a considerably extended area is likely to be planted with sugar cane, and if so the quantity available for export will be largely increased.

*OFFICIAL REPORT OF THE HAWAIIAN SUGAR CROPS.*

Year	Acres.	Total Tons of Sugar.	Yield per A.
1894-5	47,399½	153,419½	6,472 lbs.
1895-6	55,729	227,093	8,148 "
1896-7	53,825½	251,126	9,331 "
1897-8	55,235½	229,414	8,306 "
1898-9	60,308	282,807	9,378 "

Notes.—The falling off of the crops of 1897-8 was wholly due to the drouth which lasted through the year. The crop of 1898-9, although giving the largest yield per acre on record in these Islands, also shows the effect of the drouth of the previous year.

WALTER MAXWELL, Director.

Bureau of the Hawaiian Sugar Planters' Association.

Honolulu, H. I., March 10, 1900.

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*HAWAIIAN SUGAR TRADE AND SHIPMENTS.*

All the factories throughout these islands have been in operation during the past two months turning out sugar to their full capacity, and largely in excess of shipments to San Francisco and New York. As sugar was formerly sent from our islands to Honolulu for shipment abroad, that course has this year been much interfered with by the existence of the plague in Honolulu. A number of ships have been ordered to load at Hilo, Maui and Kauai, from which they have sailed direct to San Francisco and New York. This change from the old custom of loading at Honolulu will probably be only temporary, as this port possesses superior advantages for loading and rapidly despatching vessels. Present indications are that before the end of March the quarantine embargo will be raised, and sugar ships will receive their normal quick despatch. The crop now being harvested has been estimated at about 20,000 more than that of 1899, which was 282,807 short tons.

The weather throughout the group has been favorable for harvesting the sugar crop, but some of the districts that rely wholly on rain, have suffered from a lack of it, as the year 1899 was a very dry year in this group, as it has been in other sugar countries. Each year, however, new artesian wells have been

opened here, which add to the value and outcome of the crops. There is an impression, however, that this source of irrigation supply, which at present is a most bountiful one, has a limit, and when that is reached, a general decrease in the annual supply may follow. Already one artesian well on Oahu, which had been flowing abundantly for ten or twelve years, has suddenly ceased to flow, showing that its source of supply has given out. It is thought that other wells which have been lately opened farther inland, and in the neighborhood of this, have reduced the level of the artesian basin to such an extent as to render the lower one valueless—which supposition may quite probably be the real cause of the stoppage. A record is kept by the government, showing the height to which the water is raised in several of the city wells, and though a slight decrease is shown, it has not been sufficient to create any anxiety. Evidently there is a limit to the artesian supply.

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*COST OF CULTIVATING SUGAR CANE.*

In a report on the cost of cultivating sugar cane in Barbadoes, W. L. Mr. J. R. Bovell, Superintendent of the Agricultural Station, states: "I have estimated the cost of growing an acre of canes on a fairly good non-ratooning estate in the black soil districts, without taking into consideration the upkeep of roads and the necessary buildings, at \$61.04 (£12 12s 4d). This divided by 22.44375 tons, the average yield on a similar estate for six years, makes the cost of producing a ton of canes about 11s 4d. In corroboration of my estimate of \$61.04, I may mention that one gentleman, the proprietor of two estates, tells me he finds from his accounts that the cost of growing one acre of canes is about \$62.50 (£13 0s 5d). Another gentleman of considerable experience, in the itemized estimate he has given me, considers it to be \$65.30 (£13 12s 1d) per acre. \* \* \* \*

A further confirmation of the statement, that under existing circumstances canes are not grown on the average for less than 13s per ton, may be seen by referring to Appendix D, in which is given the actual cost compiled from the Chancery Court returns, of producing a ton of canes on five estates for the years 1894, 1896 and 1897. The first four estates are representative of the typical districts of the island, and the years

mentioned were chosen for the reason that the average is approximately the same as the average for ten years. \* \* \* \*

To briefly summarize, I may say:

1. That the average cost of producing canes in Barbados is about 13s per ton.
2. That their value under the present system of manufacture, at the current rates for last season, is about 12s 9½d per ton.
3. That their value at a properly equipped co-operative central factory, at the average price for dark crystals for last season, is 15s per ton.

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#### *RETURN OF DR. MAXWELL.*

After a brief absence of about two months, Dr. Maxwell returned from Queensland, where he had been, at the request of the Colonial Government, to examine and report on the condition of the sugar industry in that Colony. Queensland comprises the northern or rather the north-eastern province of Australia, stretching from south latitude 30° to latitude 12°, thus embracing a temperate and tropical climate and region, for the most parts well watered. So far as climate is concerned, Queensland is well suited to the cultivation of sugar cane, though it has its seasons of drought, which militates against the success of this staple.

It was to investigate the conditions of the sugar industry chiefly that the Doctor was invited to visit the Colony, and certainly no one could be more competent to perform such a service than he who is so familiar with this industry in Hawaii and especially in Louisiana, the conditions in which latter country probably more nearly resemble those of Queensland.

The Doctor is naturally reluctant to furnish any details for publication, as his report which is now in the hands of the Colonial Government will be laid before the Parliament and made public in due time. But it is clear that he considers the sugar industry in that Colony in a very unsatisfactory condition, and that the only remedy lies with the government, in co-operation with the planters, who are generally farmers with small holdings, and do their own work, with such outside help as they can obtain. There are between six and seven hundred

cane farms, and less than a score of central mills. But the Doctor thinks that this is the proper way to carry on the industry, employing white labor as far as practicable. There are other laborers employed, such as South Sea Islanders, Chinese and Japanese and perhaps Indians from Southern India. But the growing tendency is to employ white labor on small farms. Of this system the Doctor speaks very highly, and hopes it will be generally introduced here.

The following clipping from a Queensland paper refers to his views on this point: "As shown by the experts, we have a magnificent estate in our white farmers. The Doctor cannot too strongly impress upon us the advantage we possess over other cane-growing countries in having our cane fields in the hands of white men content to work small areas, and who are full of energy and grit into the bargain. He tells us plainly that we do not properly realize our special fortune in this matter. He says also that the conditions of possible cultivation are in our favor. Given a thoroughly sound, that is to say, a scientific and proper system of cane farming, and, he says, that Queensland need fear nobody."

During his visit in Australia, the Doctor collected much valuable information regarding the different colonies, which we hope he will publish for general information. Most of the varieties of canes growing in Queensland and New South Wales were obtained from Borneo, Caledonia and New Guinea, and are quite different from those grown here. These canes are supposed to have brought with them new parasites which have proved very destructive in some fields.

The Doctor has been very highly pleased with his visit to Australia, and was everywhere received with marked attention and could not have been treated more cordially, had he been a brother of the Prince of Wales. All which must be very gratifying to him. In due time we hope to receive his report of the condition of the cane industry in Queensland.

Commenting on his visit to Queensland, the Sugar Journal says: "As to the work done by Dr. Maxwell, it may be divided into two parts. He has made his own observations as to the conditions under which our industry has been and is being carried on, and he has also made the acquaintance of the men who are engaged in the work. But he has done more. He has

met a considerable number of our farmers and manufacturers and told them plainly his views upon many subjects, but more especially has he laid down for them the broad general laws upon which not only this industry, but every industry must be carried out. He did not merely tell the cane farmers of Queensland that they are a fine lot of fellows, who are the victims of continued ill fortune, but rather that they are just like the sugar growers in Louisiana, Java, Hawaii, and the French colonies, and they are now suffering the same evil results of past mismanagement, going through the same crisis, and nearing the day of regeneration in the same way as the sugar producers have done and are now doing in those other countries. That no farmer who heard Dr. Maxwell for half an hour would continue to believe that there is a royal road out of the present difficulties of the industry, may be taken for granted, our only regret is that, seeing he was prepared to talk to the farmers, and he can talk pleasantly and fluently and profitably, the necessary arrangements were not made to enable the farmers to meet him in larger numbers.

It is stated that the Queensland Government is taking active interest in the establishment at Mackay of a proper Sugar Experiment Station. In addition to the necessary experiment fields for growth of canes and trials of manures, there will be an efficient laboratory and students (of whom the Sugar Journal says three have already entered) will not only be trained in all kinds of analysis, but in keeping and arranging of necessary data for the chemical control of sugar mills. A great benefit will be conferred on the Queensland industry and the sugar industry in general by this institution, the existence by which has now become indispensable wherever it is desired to keep sugar planters and manufacturers up-to-date and able to compete with their rivals, whether in the home or the world's market.

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#### WIRELESS TELEGRAPHY.

It is really unfortunate that the plans which were so promptly made for introducing and testing the wireless system of telegraphing across our inter-island channels have been interfered with and delayed by the local quarantine. Probably no better place could have been selected for this purpose

than the Hawaiian group, where the chain of five lofty island mountains are separated by channels, varying from ten to twenty, thirty and sixty miles each. No more favorable conditions can be found in any part of the world than are here offered, accompanied by the most equable weather that could be desired, though we are not sure that weather conditions affect its working in the least. The fact that it has worked well during the war in South Africa seems to indicate that it is reliable in any weather. As those interested in this new venture here have already taken steps to carry out their plans without unnecessary delay, it is hoped that a first trial will be made on the line between Oahu and Molokai, as any defects can be more readily corrected here.

An interesting point to investigate and one to which reference has not been made, so far as we are aware, is whether this system will work better between elevated mountain peaks, like the summits of Mauna Loa, Kea and Haleakala, the two former being on Hawaii and the latter on Maui, with elevations of 14,000, 13,000 and 10,000 feet respectively. It may be found that these three mountains open a new field for discovery that may lead to benefits as great as have been found at lower or sea levels. We all know that the atmosphere becomes very rarified on mountain summits, and under favorable conditions voices can be heard a long distance off. It may be found easier and better to communicate by the wireless system between the summits of Mauna Kea on Hawaii or Haleakala on Maui, and on Oahu than from any lower points, and regardless of the distance between them. Perhaps a new field of discovery may thus be opened, for the successful working of this wonderful agency, the perfect operation of which is as yet in its infancy.

As conversation is heard over the longest lines of the telephone, and the voice of the speaker recognized a thousand miles away, why may not the voice of the operator on a mountain peak be heard and recognized at a distance of one, ten or a hundred miles, carried by the subtle agency that conveys the message in the Marconi system, and with the same reliability? It certainly looks as though here might be found a field for investigation in the undiscovered mysteries of the universe, with Hawaii offering great advantages for its study

such as are offered nowhere else, or at least so accessible and favorable for this purpose.

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*HAWAII'S COMMERCIAL PROGRESS.*

The most interesting public document that has appeared thus far this year is the annual report of the Collector General of Customs, E. R. Stackable, on the commerce of Hawaii for the year 1899, for a copy of which we are indebted to the Minister of Finance. The report covers the foreign commerce of the territory, and the statistics presented show it as in a very prosperous and expanding condition. We quote from page 3: "The foreign commerce of the year has been marked by three especial notable characteristics: First, a continuation of the phenomenal imports of last year; Second, a moderate increase in exports; and, Third, the combined imports and exports form the largest total ever shown by a single year in the history of this country. The total imports during the year 1899 were \$19,059,605.79, as compared with \$11,650,890.81 in 1898. The exportations of 1899 were \$22,628,741.82, as against \$17,346,744.79 in 1898. The total foreign commerce for the year 1899, thus stands, \$41,688,347.61, against \$28,997,635.60 in 1898, or \$12,690,712.01 greater than in any preceding year."

If any more forcible statement were desired to show the wisdom of the American Government in annexing Hawaii, we know not where to look for it. Hawaii is not only a self-supporting state, but one whose growth is characteristically American, based on American methods, in all its internal workings, and one which we doubt not will add to the glory of the mother country.

Detailed statements are given of the imports and exports in the commerce between Hawaii and the ten countries having trade connections here. As is well known, our commerce is chiefly with the United States, which is quite natural, as she takes nearly all our produce, and pays for it largely in domestic products which are obtained by us there cheaper and more readily than from any other country, by means of the rapid steam and sail fleets plying between this group and the Mainland. This trade, it may be remarked, is developing each year with the aid of the finest steamships and sailing packets, found

in any part of the world. Hawaii is thus rendered accessible for tourists and traders, of whom an increasing number arrive and depart each year.

The following table shows the countries with which Hawaii trades, and the value of the imports from and exports to each:

	Imports.	Exports.
United States .....	\$15,020,830 17	\$22,517,758 82
Great Britain .....	1,774,655 52	.....
Germany .....	384,102 88	.....
China .....	384,522 00	.....
Japan .....	673,410 50	54,052 00
Australia and N. Z. ....	257,388 04	39,863 38
Canada .....	113,480 63	17,067 62
Pacific Isles .....	1,035 48	.....
Chile (Fertilizer) .....	222,749 80	.....
France .....	64,130 26	.....
All Others .....	163,300 51	.....
Total .....	\$19,059,605 79	\$22,628,741 82

A large part of the Collector-General's report is devoted to a detailed statement of the imports from foreign countries. Not only is every item specified, but the invoice value of each is given. This list covers one hundred and thirty pages, but we can give here only a summary of the imports and the values, the total, as stated in the report, being \$19,059,605.79.

Animals .....	\$ 234,170 39
Building Materials .....	547,177 51
Clothing, Boots, Shoes and Hats .....	639,828 09
Coal and Coke .....	343,286 96
Crockery and Glassware .....	100,582 64
Carriages and Wagons .....	220,314 88
Drugs and Surgical Instruments .....	118,696 72
Dry Goods .....	925,712 99
Fertilizers .....	957,361 05
Grain and Feed .....	586,860 13
Groceries and Provisions .....	1,547,953 46
Hardware, Iron and Steel .....	1,229,764 58
Household Furniture .....	235,518 90

Jewelry, Clocks, Etc. ....	60,424	72
Lumber .....	630,898	34
Leather .....	60,604	87
Machinery .....	2,089,278	54
Naval Stores .....	140,625	44
Paints, Oils, Etc. ....	294,824	31
Railroad Material .....	282,326	42
Shooks and Bags .....	405,933	20
Stationery and Books .....	164,984	60
Tobacco and Cigars .....	335,361	19
Wine and Spirits .....	435,830	80
Sundry Merchandise .....	3,481,310	23
Specie .....	2,990,028	83

One item of special interest, which is generally overlooked by reviewers of the customs reports, is the parcel post service, connected with the post-office department. In the United States, Canada, England and Europe the parcel post is used as a medium of conveyance between different countries, but subject to customs regulations and charges. So when parcels containing goods are received at the post-office, they have to be examined and, if dutiable, the usual tariff charges have to be paid on them. During 1899, the parcel post bureau of the post-office collected no less than \$98,604.43 as duties payable under our laws. Notwithstanding the charges made, the parcel post is the cheapest, most convenient and expeditious way to obtain small things, especially jewelry. Of the above total \$82,544.90 duty was collected on parcels from the United States, \$4,531.21 from Great Britain, and \$10,607.47 from Canada. This section of the post-office service has proved not only a great convenience in every country where it has been established, but also a source of revenue to the Government, as most of the articles would have been sent by private methods, not to say by smuggling.

One point to which we desire American readers especially to note is that nearly the entire value of our crops and local industries goes to the United States to purchase supplies—horses, mules, cattle, swine, machinery, food, steamers, sailing vessels, artesian-well outfits and many other necessaries which cannot at present be produced here as cheaply nor as well as there. The rapid progress made here is shared in by the large

foundries, machine shops and factories located in every part of the Union, and all such industries are interested in our progress and prosperity. Every visitor from the Mainland notes, as he goes from island to island, that the people of Hawaii are progressive, loyal and intensely patriotic, representing every section of the Union from Maine to Texas, and from Florida to Puget Sound.

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Central mills, anywhere in Florida or Southern Georgia, will pay their owners larger dividends than the same sum invested in any other manufacturing business, while with such modern factories to consume his cane the farmer or planter can make larger profits per acre than from any known staple, the manufacturer having an unlimited market for his product at home. The cost of a cane sugar factory of given capacity is 20 per cent less than a beet sugar factory; the cost of manufacturing cane sugar is far less than that of beet sugar. One man can cultivate twenty acres of cane, making forty or more tons of sugar; it will require three times the labor to grow the same quantity of beet sugar. A cane crop is practically certain, a total failure unknown; a beet crop is expected to fail at least one year in three.—Times Union.

The Fiji blue book shows a prosperous condition of trade and commerce in the Fiji Islands. Foreign capital has been invested and has given a return, property is secure, and the law courts command respect. Exports exceed imports, and the population is increasing. The total revenue of the islands for 1898 was \$458,249 and the expenditures \$426,276, giving a surplus of \$31,973. The population of the islands was 121,738, of which 3,927 were Europeans. The total imports for the year amounted to \$1,142,893; and the exports, \$2,599,222—all the trade being with Europe, Great Britain and colonies, and the South Sea Islands. Copra exported in 1898 amounted to \$307,266; fruit, \$123,984; distilled spirits, \$67,576; sugar, \$1,950,897; maize, \$12,035; peanuts, \$12,721; pearl shell, \$11,329.

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The time has come when, whether we seek it or not, we must have a foreign policy, must assert it, and must maintain it. If we have gained nothing else, we have gained this: That to-

day there is an American flag proudly waving, and enthusiastically cheered, on every public building in the United States. If we have won nothing else, we have won this: The admiration and respect of the whole civilized world; a prestige among nations that insures our tranquility and peace for generations to come.—Senator J. M. Thurston.

Tourists in Switzerland.—Consul Ridgely, of Geneva, on October 31, 1899, writes: It is estimated that since the 1st of January, 1899, up to the present date, no less than 2,500,000 tourists have visited Switzerland, and that they have each left in the country an average of 80 francs (\$15.44) or a total of \$38,600,000. Inasmuch as the population of Switzerland is only 2,933,300, it is difficult to appreciate the significance of these figures. The per capita wealth of the country has heretofore been estimated at \$14; but the influx of money above referred to suddenly brings it up to \$29.45, or from one of the poorest countries (per capita) to one of the richest. This at least would appear to be the result on paper; but, as a matter of fact, the sudden increase of the country's wealth is not so great as the figures would indicate, for the reason that Switzerland buys nearly everything she sells to tourists, including the supplies for the hotels and boarding houses, and therefore, while a great deal of money comes into the country, a large proportion of it has to be paid out. However, the increase in the country's wealth from the tourist movement during 1899 is notable, hotel keepers being the largest beneficiaries.

JAVA SUGAR PROSPECT FOR 1900.—The prospects of the new crop are satisfactory. The canes were planted at their proper time and rain is abundant. The only thing which is causing uneasiness is the appearance of a disease, that has been noticed in various places. The "soreb" disease, which devastated our cane fields some years ago, has been checked by a careful selection of cane tops and by a general great attention paid to the rearing of sound and vigorous seed and does not now cause any considerable damage, though the expense connected with this forms a considerable item. A new disease has sprung up and made its appearance. The cane tops growing some times in the early period of vegetation. The leaves wither and after slicing the cane one perceives a dark red coloration in the root

end of the stalk. The vessels are choked with a gummy matter, causing the premature death of the plant.

DEMERARA SUGAR CROP.—The worst predictions for the present crop are unfortunately being realized, and according to the export figures at the present date there is a falling off compared with last year of 26 per cent. This, however, will in all probability be increased before the close of the grinding season, and the estimated shortage mentioned in our mail weather report of 30,000 tons appears to be near the mark. At the very best crop is not expected to exceed 80,000 tons, while it may be less. Last year the sugar exported was 106,000 tons.—Demerara Chronicle.

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*NEW CANE SUGAR MACHINERY.*

The well-known firm of sugar machinery engineers, Messrs. Mc'Onie, Harvey & Company, (Limited), of London, have just completed some especially heavy cane crushing machinery for the Penang Sugar Estates Company, of London and Penang, of which Sir John W. Ramsden, Bart., of Huddersfield, is the proprietor. The machinery consists of two sets of regrinding sugar-cane mills, the rollers being 36 inches diameter by 72 inches long; these are fitted with steel shafts of great strength, having journals 17 inches diameter by 24 inches long, and are carried on side frames of extra strength, which have through side and main top bolts of heavy section of steel, the latter so arranged as to give the narrowest possible return plate. The returner is of the Rocker type, and consists of a deep beam of cast steel supported on strong brackets from the bottom of the bedplate up through the side frames. The rollers run in heavy gun-metal bearings, which are cast hollow for the purpose of water circulation, thus assisting to keep the bearings cool, which is a consideration, owing to the great pressure now exerted by these large mills in order to extract all the juice out of the canes. The mills are fitted with strong, self-acting carriers for feeding the canes into the mill, also mechanical carriers for removing the crushed cane to the steam boilers. They are driven by powerful horizontal engines of the Corliss Frame pattern (the steam cylinders being 28 in. diameter by 48 in. stroke) fitted with link reversing motion and

sensitive high speed governor. The fly-wheels are extra heavy, and built in center, arms, and segments for shipment abroad. These engines transmit their power through strong double gearing to the mill; all the spur pinions of this gearing and the large pinions on the roller shafts are made of the best Siemen's cast steel; the main and intermediate spur-wheels and the segments of these wheels are also of cast steel; the shafts are of best forged steel and large proportions, suitable for the work required.—Int. Sugar Journal.

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*PRODUCING HYBRID ORANGES.*

It has been asserted on good authority that nine-tenths of the flowers which are exhibited at horticultural shows are the results of modification by the gardener's art and not purely natural growths. The improvement of flowers has been largely effected by crossing different varieties so that deficiencies in one may be made good by the virtues of another. The first intentional venture in hybridizing flowers was with the sweet William and carnation pink.

The same principle has been extensively utilized by breeders of horses, pigeons and other animals, and also with cereals. A grain having a good berry but a poor stalk has been combined with one that developed fine straw but yielded an insignificant kernel. Thus a grain which excelled both in stalk and kernel was secured.

At the International Conference on Hybridization in London, an interesting report was presented by Herbert J. Webber, of the United States Department of Agriculture, on efforts to protect the orange industry of the Gulf States. Every few years a cold wave would sweep through that region and almost entirely ruin the orange crop. The trees did not seem to be hardy enough to survive such an ordeal. The authorities at Washington, therefore, had been studying how to obtain trees that possessed greater hardiness, and at the same time produced a delicious fruit. According to Mr. Webber they attempted to cross the sweet orange with the Japanese orange or citrus trifoliata. The latter plant thrives as far north as New York, and is used as a hedge plant. The fruit is bitter and resinous, and hence unfit for use. The experiment has already gone so far that a hybrid has been obtained

which is much harder than the sweet orange. Unfortunately, the lecturer neglected to say anything as to the flavor of the fruit. Another venture in this direction is a combination of the sweet orange. The object sought is the association of a skin which may be readily removed with the delicious flavor of a typical Florida orange. Many persons like the tangerine fully as well as the Florida orange; but they are the exception, not the rule.

Crossing sea island cotton with upland cotton, a combination of one species of pineapple with another, and hybridizing maize with the Mexican grass, the osinth, supposed to be the progenitor of maize, are among the other schemes to which attention has been given by the Department of Agricultural.

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Beef is to be still higher if we credit the predictions of the men best posted in the cattle business abroad. The present high prices for beef are bound to affect the prices of pork, mutton and poultry, and it begins to look as though meat three times a day will cease to be fashionable in a good many families.

All our sugar plantations as well as all vessels trading with the American coast and the Arctic Ocean use canned meats and other provisions. For this reason the article on page 109-11 will furnish valuable information as to the best kinds of meats, fruits and vegetables for use where fresh foods are not to be had. The consumption of canned goods is increasing every year, and with the demand the temptation to palm off inferior goods also increases.

Willett & Gray's Statistical says relative to dividends on American Sugar Refining Company stock: "It is quite certain that the days of 12 per cent. dividends in this stock have passed forever. The capacity of the independents is now so great, and the increase of the beet sugar industry so rapid, that such dividend has again become impracticable, and the stockholders may congratulate themselves that the able management of the company has continued the rate at 12 per cent so long as they have. It is equally certain that the sugar war will become more severe in the future than in the past year, the decimal system of selling making closer cuttings possible."

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*THRUM'S ANNUAL FOR 1900.*

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This popular and ever-welcome handbook of Hawaii has appeared from the press with a very neat cover, a little later than usual, but none the less valuable as a handy vademecum. Besides the usual tabular work, which covers some fifty or sixty pages, there are 120 pages of fresh reading matter pertaining to the islands, among which are an account and illustration of the volcanic eruption of 1899, a report on these islands by Dr. Maxwell, notices of the death of Queen Dowager Kapiolani and the Princess Kaiulani, followed by an exceedingly interesting sketch entitled—What a Botanist may see in Honolulu—Yachting in Hawaiian Waters—Honolulu Street Characters—Waialua's New Hotel—Fornander's Legends, and several other short articles, go to make up the most interesting publication of the new year. The illustrations are not numerous, but sufficient to add to the value of the publication. Altogether it is one of the most valuable of the series that has appeared during the past twenty-six years.

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*INSECT ENEMIES OF TREES.*

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Since the publication of the February number of the Planters' Monthly, which contained a communication from Mr. L. von Tempisky, of Maui, relative to the destruction of trees on that island by insects, copy of a "Report on Insect Enemies of Forest Trees in the Northwest" has been received. It is a pamphlet of twenty-seven pages, giving a report of a research through the forests of Oregon, Washington and Idaho. The report is by Dr. A. D. Hopkins, who ranks as one of the first entomologists in the United States. He says, "the object of his trip was to study insect enemies and the causes of prevalent unhealthy conditions, rather than the subject of preventions and remedies. \* \* The inter-relation of forest fires, insect enemies, diseases of trees, and human agencies in the destruction of forests, is a problem of especial importance, the investigation of which will yield most valuable results. In conclusion, may I suggest that the increasing public interest in forest protection, the vast forested domain included in reserves and national parks, the aggregate public and private

wealth in undeveloped forest resources, and the extensive destruction of the best timber each year by insects and related evils seem to warrant giving this heretofore neglected feature of the forest problems of this country especial attention. It is a line of scientific research which, in consideration of its relation to their work and interests can not fail to receive the hearty support and cooperation of other divisions of the public service—such as the Division of Forestry, the General Land Office, the State experiment stations and forestry schools.”

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HAWAIIAN PUBLIC LANDS.

By the Hon. Sanford B. Dole, President of Hawaii.

In the year 1839 King Kamehameha III issued a proclamation, granting to the Hawaiian people the right of acquiring real estate and other property, and holding the same without interference.

Up to that time the ruling chief was, in his sovereign capacity, the proprietor of all the lands of the kingdom, both chiefs and people occupying whatever lands they held as tenants at will, who might at any time be ejected without notice by the king, and also, in the case of the inferior chiefs and people, by their immediate landlords.

During the year 1848 terms of division of the lands of the kingdom were arranged, after much deliberation, between the king, the chiefs and the people. These, briefly, were as follows: To the king a third, to the chiefs a third, and to the people a third.

In carrying out this agreement all of the common people who were occupying land, either as house lots or cultivated patches, received, upon proper application, awards for the same. These awards were recognized as titles in fee, and could be formally perfected by royal patents—owners of town lots being required to pay for such patents an amount representing one-fourth or, in some cases, one-third of the original value. In like manner the chiefs received awards for the lands in their possession, to be perfected by royal patents upon payment of one-third of their original value. This settlement was generally made by the surrender of a third in value of their lands.

These payments were to the government, which now, for the

first time, had become an entity distinct from the sovereign, and qualified to acquire property.

A large list of lands was, as a part of the agreement, surrendered by the king to the government, making, with the small holdings taken up by the common people and the lands surrendered by the chiefs, the people's share; the balance, an imposing list of valuable lands, remained as the estate of the sovereign.

The number of holdings taken up by the common people came up to 11,132, aggregating 28,658 acres and averaging 2.57 acres apiece. Many more might have been acquired but for the apathy of those entitled to claim them through their inability of appreciating the importance of the opportunity. A considerable number of the small holdings so acquired have since passed into the hands of foreigners through direct sales or mortgage foreclosures.

The lands of the chiefs have also largely become the property of foreigners by the same methods. This result was accelerated by the rapid extinction of the families of the chiefs in the direct lines, and the consequent distribution of their estates among collateral heirs.

Between 1850 and 1860 the government, under a policy of affording native Hawaiians further opportunities of acquiring land, made a large number of sales of lands of moderate area. From that period until a few years previous to the termination of the monarchy the government has had no definite land policy. Public lands have been generally leased under long terms and sometimes have been sold in large tracts, according to the importunities of capitalists and the need of the government for money. Five of such sales alone aggregated 353,724 acres. Beyond the placing of a number of house lots in Honolulu on the market, inaugurated by Mr. Wilder, then Minister of the Interior, about the year 1879, no attention was given to any further development of the policy of furnishing lands to small holders; on the contrary, applicants for small parcels were often ignored.

In the year 1884 the Legislature enacted a law providing for the sale of homesteads to such persons as wished them for permanent occupation. The administration, however, were so little in sympathy with the policy of this law that no action was taken under it until 1888, when the new administration,

which had come into power under the revolution of the previous year took vigorous measures to carry out its provisions. Up to the time of the enactment of new land legislation in 1895, about 543 homesteads were taken up, aggregating 8,488 acres and appraised at \$68,047, or about \$8 per acre, and averaging 15 9-10 acres and a value of \$127 apiece.

These homesteads were occupied under an agreement, and a land patent conferring a fee simple title was delivered upon the performance of the agreed conditions of payment, improvement and residence.

The land act of 1895 was far more comprehensive than anything that had preceded it, and covered the whole administration of the public lands, excepting town and forest lands, parks and roads, which remained in the charge of the Minister of the Interior under the existing laws. The settlement of individuals on small holdings was its predominant feature. All other considerations were made subservient to this policy. General leases were limited to 21 years, and contained a clause whereby the government at any time might take possession of any part of the leased premises for settlement purposes, discounting the rent accordingly. Unconditional land sales at auction were limited to parcels of not over a thousand acres.

This act makes the following classification of the public lands: two classes of agricultural land, two classes of pastoral land, wet land, forest land and waste land.

Four special methods were provided for furnishing land to applicants wishing to occupy the same—*i.e.*, Homestead Leases, Right of Purchase Leases, Freehold Agreements and Special Agreements of Sale. Of these the Right of Purchase Lease has been the most popular with a list of 356 holdings taken up; the Special Agreements of Sale comes next with 122 holdings; Homestead Leases, 115 holdings, and Freehold Agreements, 23 holdings.

The holdings occupied under these different systems, aggregating 616 in number, have a total area of 28,065 acres and an average area of 45.56 acres. Their aggregate value at the time of occupation, as appraised, was \$178,464, or \$289.70 apiece and \$6.36 an acre.

Homestead Leases are for 999 years, cost nothing to the applicant except a small fee for papers, cannot be sold, mort-

gaged or devised. They may be not over 8 acres in first-class, 16 acres in second-class agricultural land, 30 acres in first-class or 60 acres in second-class pastoral land.

Right of Purchase Leases are for 2 years. The land is appraised and the lessee pays 4 per cent. on the appraised value half yearly. If he resides two years on the premises and in that time has 25 per cent. of the area under cultivation, or resides four years and cultivates 10 per cent., and performs other required conditions, he may at any time thereafter, before the last year of the lease, purchase the premises by paying its appraised value. Such leases may be for not over 100 acres first-class, 200 acres second-class agricultural, 600 acres first-class or 1,200 acres second-class pastoral land.

Freehold Agreements are obtained at auction and require residence, improvement and payment of consideration in yearly installments for the ultimate grant of a title in fee simple. Area limited as in Purchase Leases.

Under Special Agreements of Sale, parcels of land under 600 acres may be offered at auction. The successful bidder agrees to pay the price bid, in annual installments, with interest, and to make designated improvements and perform such conditions of residence and cultivation as may be required by the Land Commission in its discretion.

This system is especially convenient in that much discretion is given to the government as to conditions to be performed by the occupant before he becomes entitled to a patent, thus furnishing a needed opportunity of adjusting details according to circumstances and possible new phases of the demand for such holdings.

Upon the organization of the Republic of Hawaii the administration of the public lands was considered to involve economic and political questions of sufficient importance, together with the urgent matter of an ocean cable to the United States, to justify the calling of a special session of the Legislature.

In view of the possible failure of the project of annexation to the United States, it was deemed necessary to develop a citizen class which should, by its conservatism, industry and intelligent interest in public order, become a reliable support to the government of the Republic. There appeared no more effective way of accomplishing this than by opening the public

lands to those, both from the existing population and future immigrants, who would be ready to occupy them permanently as farmers. The privilege of taking up lands under this policy was limited to citizens, and such others as might receive the privileges of citizenship through letters of denization. At the same time the Legislature had in view the alternative of annexation, and the policy of this legislation was considered to be fully in the line of the public interests if that should occur.

The arable and grazing lands of the Hawaiian Islands are much cut up by precipitous canyons and rugged mountain ridges. There are but few level stretches of any great extent, the greater portion of such lands sloping toward the sea or valley bottoms at a great variety of inclination. A considerable part is covered with tropical jungle.

Under these circumstances the surveying system used by the United States in laying out its public lands is impracticable for Hawaii; for these reasons and in view of the limited extent of the public domain the American homestead laws were considered to be unsuitable to Hawaiian conditions.

It was also felt that it was important that the landless portion of the native Hawaiians should have favorable opportunities for acquiring permanent homes for themselves and their descendants, both for their own personal welfare and in the interests of the body politic; and also, to some extent, from a sentiment toward the Hawaiians as the original occupiers of the country. The provision for the inalienable homestead leases in the land act was intended primarily for their benefit, though all the methods of obtaining land are open to them.

The results have been somewhat disappointing. In proportion to their numbers comparatively few Hawaiians have taken up homestead leases or lands under any of the methods provided in the act. There are several reasons for this; the Hawaiians from the time of Kamehameha III have been slow to appreciate the importance to themselves of permanent holdings. The only spontaneous interest in land proprietorship which they have shown has taken a communal form. During the sixties companies of natives in different parts of the group purchased considerable tracts which they and their respective heirs and assigns have since held in common. This cumbersome tenure is still popular with them, and any opportunity of acquiring lands on such a basis would to-day un-

doubtedly be hailed by many Hawaiians with great enthusiasm. The attractive feature in such partnerships seems to be a common grazing tract, where each member might pasture as many horses or cattle—especially horses—as he liked.

The different governments of Hawaii have always favored the policy of leasing rather than selling public lands to those desiring large tracts partly for revenue and partly from a reluctance to giving up their control.

The Republic of Hawaii has developed this policy especially as a means of revenue. In consonance therewith the land laws have provided for "general leases," which may be made for any term not over twenty-one years, and also for a system of leasing town lots for business purposes; such leases being made for any term not exceeding thirty years, and requiring the lessee to put up fire-proof buildings of design and material satisfactory to the Minister of the Interior, and to keep the same insured for the benefit of the government; such improvements reverting with the land at the termination of this lease.

This is a policy of great local importance, inasmuch as the prospective loss of Hawaiian tariff revenues which will be caused by the extension of American customs regulations to Hawaii will compel the local government to develop its resources to the utmost to make up as far as possible this great reduction of its income. The land revenues have been relied on to cover a large part of this deficiency. The rents from government and crown lands outside of Honolulu in 1890 were \$80,268. In 1898 such rents amounted to \$95,228. In the meantime the area of leased lands has decreased by many thousand acres through the policy of reserving lands for settlement purposes.

Annexation, when complete, will indeed cut off a considerable measure of the cost of carrying on the local government, such as military, customs and post office expenses, but such relief will in no wise offset the loss of the customs revenues as they existed before annexation. Moreover, with the rapid development of the country under the stimulus of annexation, there will be need of increased expenditures for public improvements.

These circumstances were evidently considered in the provisions of the joint resolution of annexation, corresponding

with the treaty of annexation in this particular, wherein the revenues and proceeds of the public lands were guaranteed to the local government.

As the public lands of the Hawaiian Islands are limited, and a large proportion of them are comparatively valueless, the importance of the leasehold system is apparent. It is equally apparent that a repeal of this system, which would force the public lands on the market, would defeat the provision of the joint resolution referred to, and deprive Hawaii of a material part of the consideration upon which annexation was effected.

The Hawaiian leasehold system is also important to the country in another way. The policy of land settlement in small holdings, which has been referred to in an earlier part of this paper, if necessary to the country in its independent condition, may be regarded as imperative under annexation. This system conserves the public domain, with adequate provision for furnishing land to settlers according to the demand, under the reservation in the general leases of the right of the government at any time to take possession of any part of the leasehold for settlement purposes. The repeal of the leasehold system would tend to throw large tracts of lands into the permanent ownership of sugar corporations and other capitalists, thus depriving the country forever of their control for settlement purposes.

By the constitution of the Republic of Hawaii the Crown lands were placed on the same footing as government lands and have ever since been administered under the same laws. The area of Crown lands in 1894 was 971,463 acres; the area of government lands at the same time was 821,316 acres.

Honolulu, Hawaiian Islands.

—N. Y. Independent.

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### TROPICAL CANE IN LOUISIANA.

That plants can adapt themselves to marked changes in environment, and meteorological influences is clearly demonstrated by the fact that some of the most valuable which supply the requirements of the human family, and the domestic animals as foodstuffs, etc., are now extensively cultivated in regions far removed from their habitat—notably maize, tobac-

co, potatoes, and tropical cane; but particularly in somewhat recent years the beet has been successfully grown and revolutionized the sugar industry, and for the time being, at least, relegated the cane to a very secondary position as a source of supply to meet the growing demand in the markets of the world. Recently published statistics show that the growth of the beet sugar industry since 1871 has been phenomenal—that year the output was 1,020,000 tons, cane sugar 1,599,000 tons, and the yield for 1899-1900 is now estimated at 5,510,000 tons for beets, and only 2,904,000 tons for tropical cane sugar, showing that sugar from the one plant has increased over five-fold, and the other under twofold.

Prices have declined from 5.37 cents per pound in 1871-2 to 2.39 cents per pound in 1898-9, over one hundred per cent, yet there is about an average annual increase in production of 250,000 tons of sugar, which, under normal conditions, would mean an augmentation of 125,000 acres. On this continent the beet sugar industry has made rapid strides in the recent past, and if prices are maintained the area will, without peradventure, be largely augmented in time; yet if given an agricultural population as dense as in the beet producing portions of Europe, it is very questionable if the plant would even then be as extensively cultivated in this country as there, from the simple fact that here the Indian corn or maize can be successfully grown from Maine to Mexico, and from the great lakes to the Gulf. Corn is the fallow or cultivated crop of the United States—similar to turnips and beets in Europe, and here, under average conditions, animals can be fattened for the shambles over this immense area with corn at less cost than with root crops, as it can be left in the fields for months after maturity without any serious injury, and can be cultivated at less expense per acre.

Commercial sugars from the tropical cane have been produced in Louisiana for more than a century—what part will be played in supplying the nation's annual demand for sugar in the future cannot be prognosticated; yet there are cogent reasons for entertaining the belief that under certain conditions the industry is destined to survive, regardless of the fact that production is at times seriously handicapped by low temperatures. On the first of March, 1896, a freeze killed the young cane crop to the ground, yet that year the tonnage yield

was the largest ever harvested to date, and last year the February freeze was the most severe on record, the spring cold and backward, with a rainfall much below the normal; yet the canes during the recent campaign in many instances contained 200 pounds of available sugar per ton. All cane growing countries have their drawbacks; but some, in a measure, can be counteracted by the ingenuity and perseverance of man—here after the *bete noire* freezing temperatures, the most serious obstacles are the flat conformation of the land and large rainfall. The pioneers in cane culture in the state appreciated the necessity for drainage when canals and outlets had to be cut by manual labor, and the time is near at hand when cane growers will fully realize how imperative it is to have recourse to the dredge boat, and modern appliances, such as were used in cutting the Chicago drainage canal, to expedite the flow of flood waters from the cultivated fields. The cane fields of the parishes bordering on the Gulf of Mexico will only be effectively drained when tide level will be had in the canals of back fields, and basins are emptied to receive heavy precipitations.

Planters of the old regime prior to the sixties like Mr. Valcour Aime, Mr. Henry Doyle and others who were successful cane growers and sugar manufacturers, although ignorant of the chemistry of the cane as now understood, and to whom bacteria and micro-organisms were as a sealed book, were they alive to-day and in their prime would be the leading spirits in the industry, as they were thoroughly practical men, who labored with greater assiduity to secure good drainage and a friable seed bed for planted crops, and tilth (the essential to healthy plant growth) by judicious and, if necessary, more frequent cultivation than do many at the present day who are favored with improved implements, and commercial manures in various forms to augment acreage yields of cane and corn.

Scientific research has proved that where drainage is defective the action of the soil ferments is minimized, impoverishment the result; and even with liberal applications of extraneous manures results commensurate with the outlay are not had at harvest time. The tropical cane revels in heat and humidity; but supersaturated soils and stagnant water are deadly foes, as the roots cannot perform their functions and stunted canes result from starvation.

To insure its survival, the tillage of the tropical cane in Louisiana must be superior to that in any other country—to continue to upturn tenacious furrow slices with the double plow in cultivation will be to retard progress—it is an agricultural barbarism (pardonable only under very adverse conditions)—costly in the extreme, and contrary to the laws of good husbandry. The progressive planter in Louisiana is ever taking precautionary measures to avoid the injurious effects from climatic extremes, as he recognizes the fact that his fields must be in such condition that his canes can do here in nine months what is accomplished in the tropics in sometimes twice that period. The land must be so ridged and drained that bacterial action can be accelerated to render the plant food available, which desirable end can only be attained through the instrumentality of a mellow soil. Knowing that plant food must be in excess of crop requirements (except in the case of nitrogenous compounds), fertilizers must be applied to supply deficiencies, as the two crops of cane tend to exhaust the soil of nitrogen, potash, and phosphoric acid, and the corn crop to follow makes similar demands on the soil but in a minor degree. Although a valuable forage plant when harvested in good condition, yet strenuous efforts are being made to substitute alfalfa clover, etc., such as to be enabled to plow under the entire pea vine crop grown on the corn acreage as a green manuring as the humus not only retains moisture during periods of drouth, but accelerates the action of the micro-organisms on the soil particles, and the mineral elements are rendered available for plant food. An approximation to maximum yields of sugar in the cane fields of Louisiana (there it must be made to be had at the factory) will never be had until clod formation in cultivation after the first of May is rigorously obviated, and the application of crude nitrogen, whether vegetable or animal, is confined to corn areas, fall planting and plowing or early in the year, except in small quantities in extreme cases, because at that time plant canes and ratoons begin to root independently, seeking nourishment other than through parent stalks and stubble stumps, and then the soil should be in a condition to permit of profuse root ramification, and nitrates (not potential nitrogen in excess) and soluble phosphoric acid and potash should be in the soil to promote rapid growth and stalk elongation in

June, July and August, at the end of which time the stimulating manure should be well exhausted to enable the canes to mature in readiness for the campaign.

To destroy the contiguity of soil particles eighteen inches or two feet on each side of the growing canes after the land has been compacted by heavy rains without having to resort to the double plow may tax the ingenuity of the implement maker, yet a machine on wheels where the mules can walk in the water furrows, which will perform the work effectively will be in good demand, as rapidity and efficiency are factors of importance in cane culture in this latitude where extraneous vegetation grows rampant after the first of May.

For two campaigns in succession the output has been in many instances disastrously low, and the present condition of the fields is such that it will take at least two years to get numbers of the plantations in desirable rotation. On the majority of the places the seed cane was more or less damaged before and after the February freeze, and in consequence the stand of plant cane was defective. The winter to the first of January having been an open one, much of the stubble sprouted, and the chances are a ratoon crop next spring may be lessened by an inclement winter. As a precautionary measure to enhance the chances of good seed cane for another year it may be expedient with some to plant and cultivate an area to be saved for seed, and the ratoons, if small and scattering can be cut for the mill.

Lands to grow plant cane for seed should be well drained, sandy if possible (cane may follow cane if soil requirements are suitable) and somewhat exhausted of nitrogenous manures, as the yield should be less than twenty tons per acre to obviate the risks of green, crooked canes when the time arrives to put them in windrow. When the season becomes propitious, which is generally the case between the tenth and twenty-fifth of February, the land should be well prepared, with a mellow seed bed. If the canes are sound one stalk and a lap will prove ample for the acreage yield desired. The canes, to insure healthy, not luxuriant growth, should in May, be fertilized with from 250 to 300 pounds of chemicals, with about 7 per cent nitrogen and 7 per cent of phosphoric acid. The cultivation should be frequent to insure freedom from grass in the middles after the crop is laid by, as extraneous vegeta-

tion ferments under the windrowed canes, engenders heat—the result incipient dry rot, and later damaged seed. The middles where the canes are destined for seed should be moderate in depth, deep middles often cause water soaked butts, particularly if the winter should prove a very prolonged, wet one. Better financial results will be had by planting one sound cane and a lap than filling the row with defective seed as was proved during the past season.

To secure a large output of sugar during the coming campaign on the majority of places in the state will necessitate an unusually favorable season, and possibly a resort to some measures other than customary, as the bulk of the raw material for the factories will be plant cane, all of which if treated in the ordinary way, may have a low sucrose content until the latter part of October or later.

Canes destined for the mill early in the campaign may receive different treatment from those to be cut later; as thin plantings on limited areas may be resorted to, and the fields may be laid by earlier with a shallower cultivation, thereby hastening maturity through the instrumentality of sunlight, air, and tillage. Another factor of importance is the quality of the available plant food, as illustrated by the following experiment made years ago. Canes without manure tested by the polariscope at the end of September gave 10.7 sucrose, with about forty pounds of nitrogen in cotton seed meal 7.7, and with about an equal amount of nitrogen in chemicals, with potash and phosphates 9.2 sucrose, an increase of 1.5 sucrose over and above the other manured field, an amount more than equivalent to twenty pounds of sugar per ton of cane.

The stubble of the thinly seeded and early cut fields can be plowed out and planted in corn the following spring to recuperate the land for the cane crop to follow.

The losses which resulted from defective seed cane last year can never be known, and some of the causes may remain shrouded in mystery; but of one thing there can be no doubt, the tropical cane industry in Louisiana will never be brought to the high standard of excellence it merits, until canes destined for seed receive more careful attention, and their treatment is better understood. Several important points were emphasized last spring—from two and a half to three inches

of friable soil on windrows will protect canes from the lowest temperatures experienced in this latitude, canes of moderate tonnage with small, compact eyes kept best. and heavy, crooked canes, with elongated eyes were almost invariably defective. The cane grower of long experience never selects new land on which to grow cane for seed; because they grow too rank, lose their upright position, becomes crooked, then again, autumnal storms prostrate them, they take a second growth, and the eyes become enlarged and elongated through the action of the excess of available nitrogen in the virgin soil. The lessons taught are, aim to grow a moderate tonnage to secure straight canes, cover with friable soil, but not deep, grow canes on comparatively exhausted lands and manure in limited quantity, and with elements to be utilized by the growing crop prior to the equinoctial storms, to reduce the chances of elongated eyes to a minimum.—Louisiana Planter.

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#### CANNED GOODS IN THE ANTARCTIC FROZEN REGIONS.

Dr. Frederic A. Cook, surgeon of the Belgian Antarctic expedition, in his narrative in the November *McClure's Magazine*, says:

“We ate little, and were thoroughly disgusted with canned foods. We tried the meat of the penguins, but to the majority its flavor was too ‘fishy.’ We entered the long night somewhat underfed—not because there was a scarcity of food, but because of our unconquerable dislike for such as we had. It is possible to support life for seven or eight months upon a diet of canned foods; but after this period there is something in the human system that makes it refuse to utilize the elements of nutrition contained in tin. Against such food, even for a short period, the stomach protests; confined to it for a long period, it simply refuses to exercise its functions. Articles that in the canning retain a natural appearance usually remain, especially if cooked a little, friendly to the palate. This is particularly true of meat retaining hard fibers, such as ham, bacon, dried meats, and corned beef. It is also true of fruits preserved in juices, and vegetables, such as peas, corn, and tomatoes, and of dried things. Unfortunately, this class of foods formed a very small part of our store.” [Why, then,

did Doctor Cook make such a sweeping condemnation of canned foods?—ED.]

“We were weighted down with the supposed finer delicacies of the Belgian, French, and Norwegian markets. We had laboratory mixtures in neat cans, and combined in such a manner as to make them look tempting—hashes under various catching names, sausage stuffs in deceptive forms, meat and fish balls said to contain cream, and mysterious soups; and we had all the latest inventions in condensed foods. But one and all they proved failures as a steady diet. The stomach demands things with a natural fiber or some tough, gritty substance. At this time, as a relief, we would have taken kindly to something containing pebbles or sand. How we longed to use our teeth!

“The long darkness, the isolation, the tinned foods, the continued low temperature, with increasing storms and a high humidity, finally reduced our systems to what we will call polar anaemia. We became pale, with a kind of greenish hue; our secretions were more or less suppressed. The stomach and all the organs were sluggish and refused to work. \* \*

“To combat this we now took to a forced diet of fresh meat. Fortunately, we had on hand quite a supply of snow. We sawed the frozen meat into steaks, and fried them in oleomargarine. The men improved so rapidly on this diet, that, though they objected to its fishy taste, they voluntarily ate it to the exclusion of almost everything else. Penguin and seal steaks, when once you have trained your nose to forget the odor and educated your palate to the dire needs of your system, are not bad. But to eat them is a matter of education under pressure. The flavor is unlike anything that I had tasted before. Imagine beef steeped in cod liver oil for several months and then fried in train oil, and you will have an idea of our most prized relishes.”

The experience of the officers and crew of the *Belgica* with canned goods during the imprisonment of that vessel in the Antarctic ice, within the polar circle, is in marked contrast to the testimony of Brigadier-General A. W. Greely during his stay in the Arctic regions, as follows:

“I have your letter of July 13, referring to my previous letter on the subject of canned provisions. You ask me to state the effects of freezing upon canned fruits and vegetables,

especially as regards the texture and flavor of tomatoes, corn, etc. Apples, peaches, pears, rhubarb, green peas, green corn, onions, and tomatoes were all subject to extreme temperatures (over 60 degrees below zero) and were solid for months at a time. The second summer they thawed, the following winter froze solid again. All the articles named presented the same appearance as though freshly canned, and their flavor was as good when the last can was eaten as in the first month. It should be understood that these were first-class canned goods and from dealers of standing and reliability. Cranberry sauce, preserved damsons, preserved peaches, and fruit butters suffered certain changes from candying, etc., which detracted somewhat from their flavor, though not materially so. Dealers in such preserves predicted that such conditions and changes would occur. I had also canned turnips, squash, beets, and carrots, as well as pineapples, cherries, grapes, clams, shrimps, and crabs, which, although not subjected to such extreme temperatures as the foregoing, yet froze and thawed repeatedly without injury. No can of any kind except a few—say half a dozen—of fruit bitters was ever burst by action of cold or heat. No illness of any kind occurred prior to our retreat, and those most inclined to canned fruits and vegetables were the healthiest and strongest of the party. I have written thus fully in answer to your letter from my conviction that the excellent quality and variety of canned provisions contributed materially to the unequalled health of my command during the two years we passed in unparalled high latitude. The importance of good canned fruits and vegetables to parties unable to obtain the fresh article cannot be overrated, and so I speak with no uncertain tone on the subject.

Sincerely yours,

A. W. GREELY, U. S. A."

Sir John Ross, in referring to the canned stores (preserved meats and vegetables) on Fury Beach, says: "Though quite exposed to all the changes of the climate for four years, they had not suffered in the slightest degree. \* \* \* Nor did the taste of the several articles appear to have been in the least degree altered."

"At Christmas dinner (1831), says Ross, "the only fact worth remembering was a round of beef which had been in the *Fury's* stores for eight years, and which, with some veal and

some vegetables, was as good as the day on which it was cooked."

"In 1835, Ross says, "the meat canned in 1823 was as good as when it went out of the hands of the maker, \* \* \* without even the diminution of flavor in such things as hare soup and *purée* of carrots."

It is unfortunate that the Belgian expedition selected the wrong assortment of canned foods, and that Doctor Cook should condemn foods in tin in general, when, according to his narrative, the fault was principally due to foreign concoctions, such as "hashes, sausage stuffs, and meat and fish balls in cream." His fellow scientists have found that the nutritive value of many canned foods is higher than an equal quantity of the same foods in a fresh state. General Greely's main dependence for two years was on American canned foods and not Belgian canned mixtures, and his testimony quoted above is in harmony with that given by other Arctic explorers, including Ross as early as 1835.

The nutritive value of canned meats and fish was demonstrated in Farmers' Bulletin No. 34, by Charles D. Wood, of the Storrs (Conn.) Experiment Station. In a very elaborate table he showed the chemical composition and fuel (food) value per pound of meats and fish.

From the experiments made it was found that canned corned beef is of greater food value than fresh lamb, veal, or mutton, but not equivalent to the better cuts of fresh beef, while superior to the round, shank, shoulder, or chuck with shoulder.

Canned salmon is of greater food value than any sort of fish, except fresh salmon, and is not much behind the edible portion of that, and if compared with fresh salmon as purchased, quite as valuable, the calories of the latter being 925 against 890 for the canned salmon.

Canned chicken or turkey is nearly equal to the best cuts of fresh beef; decidedly better than fresh veal; on a par—in fact, ahead—of lamb, and as good as mutton.

Deviled ham has a high nutritive value, and is better than fresh pork.

Sardines must rank high as a nutritive article of diet. Canned lobsters are on a par with fresh.

*THE TREATMENT OF SUGAR RESIDUES IN DEMERARA.*

Among the varied details which have claimed attention in sugar manufacture during the last two decades the treatment of the precipitated impurities in the form of bottoms, skimmings, etc., occurring in the preparation of the juice for concentration and crystallization, has taken a prominent place, and the method of dealing with these generally adopted has been that of filtering the subsided "dirt" through high pressure filter presses, washing the cake thus obtained with water or steam, preferably the former. This process is efficient, the loss of sugar with good working running between 5 and 7 per cent of the sugar originally present in the juice. The initial cost of the plant, however, and the expense of filter cloth, labour, etc., is somewhat high, and any process which would reduce, or do away with this, and at the same time deal as efficiently with the residues, would be welcome.

During the last year or two, a method of treatment of "bottoms" and "skimmings" has come into operation in a few factories in the colony, which is claimed to satisfy the requirement, and to provide a process which gives a maximum of efficiency with a minimum of cost.

This process consists in subsiding the matter to be dealt with in the ordinary way, and, after decantation of the clear upper liquor, distributing the residue over the megass going from the first to the second mill. It may here be mentioned that the bulk of this amounts to somewhere about ten per cent of the total juice expressed from the cane, and pretty nearly that proportion of the sugar is contained in it.

The squeeze of the mill, it is claimed, separates the juice entirely from the precipitated impurities, which go away with the ultimate megass to the furnace, the juice separated mixing with the second mill juice, and thus finding its way once more to the clarifiers.

On the face of it, the process appears to be an admirable one. No special plant is required, there is no expense for filter cloths, no labour for handling the filter presses, no steam to work the montjus or pump. But, and this should be writ large, there is every reason to believe that extensive loss of sugar results from its use, and it is a pity that the ready determination of this loss, from the constant re-admixture of old

juice with new, is a matter of considerable complexity and difficulty.

However, consideration of the subject will go far to place the process in its proper position. Those who have studied this question, specially where the factory details have been arranged so that the determination of the crushing percentage forms a part of the daily routine of record realize how much the extent of extraction of the juice from the cane depends upon the quality of the crushing of the first mill. In fact, it may be laid down that the maximum of total crushing cannot be obtained unless good work be done in the first mill, and that if the latter be relaxed, a corresponding loss will occur with the second mill.

Now, the addition of juice in the form of "bottoms" to the megass coming from the first mill produces pretty much the same condition as when bad first crushing is done, and there will be a corresponding loss of juice.

To show that this is the case, evidence may be adduced from figures afforded by maceration experiments. In a particular instance I have in mind, after the addition of 10 per cent. of the total juice in the form of water to the first megass, about the same as with skimmings, the composition of the megass was as follows:

	Juice.	Fibre.
Without maceration, per cent.....	58	42
With maceration, per cent.....	61	39

Here, with identically the same canes, and as the average of several observations, the effect of adding water to the first megass has been to increase the proportion of juice left in the second. Now, the very *raison d'etre* of the scum process under review is that there shall be no increase in the juice contents of the second megass due to its use; and the fact that with maceration the juice content, although of diluted juice, is increased, is strong presumption evidence of heavy loss in the former process.

In one or two instances, I believe, where this scum process has been employed, after the first withdrawal of the decanted liquor, water is added, and after re-subsidence, a further quantity is drawn off, and the juice-diluted residue then added to the megass. This would diminish the loss of sugar from this source, and would lead to a slightly increased extraction of

sugar from the sort of maceration induced. But the water added, equal to 10 per cent. of the juice, would have to be evaporated, and maceration pure and simple might just as well be adopted.

While on the subject, it might be as well to point out what the cost of working a well-equipped plant of filter presses really is. Taking a 4,000 ton factory, the plant will cost £1,000. The working expenses may be put down at:

Filter cloths .....	.13 per ton
Labour .....	.12 per ton
10 per cent. on capital for interest and maintenance .....	.12 per ton
—	
Total .....	.37

Fuel has been omitted, but certainly would not exceed .03 where there was a shortage of megass. The total cost would, therefore, be 40 cents per ton of sugar. This, taking the value of a ton of first sugar at 72 dols., with second sugar and rum, would represent 66 per cent. sugar; added to the .7 per cent. lost by the press process, this would give 1.36 per cent. as its sugar cost. I have no manner of doubt that the loss by the megass process is largely—very largely—in excess of this.—F. I. S., in *Argosy*, Dec. 2.

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CURRENCY IN CHINA.

In a letter to a correspondent in Tennessee (to whom Advance Sheets have been sent), Consul-General Goodnow, of Shanghai, under date of January 8, 1899, says:

The Mexican dollar is the coin generally used in China among foreigners. A clean Mexican dollar passes current in all the treaty ports and at all considerable towns in the interior which trade direct with the treaty ports. In the interior of China and in the smaller towns, block silver is used. The silver is cast in the form of the sycee, or shoe, on which is stamped the fineness; and in making purchases, a piece is cut off and sold to the local bank for its equivalent in copper cash. Of this cash, 1,800 equal a gold dollar, and one can judge of the standard of wages and the scale of expenditures where everything is estimated by cash. Cash, however, are the real circulating medium of the Chinese of the greater part of

China; and the Mexican dollar is the ordinary circulating medium only in connection with coreigners. A "chop" dollar—that is, one on which one or more firms have stamped their monogram, or chop, insuring its genuineness—circulates at a discount below the clean dollar of from 2 to 6 per cent, varying at different times and in different places. The subsidiary coins are 5, 10, and 20 cent pieces; but just now, a dollar is worth more than the smaller coins making up the 100 cents. Why this is so is a mystery to me, but the fact remains that to-day in Shanghai a clean Mexican dollar is worth ten 10-cent pieces and 18 copper cash.

There are Chinese coins imitating Mexicans, but they only pass current in the viceroyalty where they are minted. Several of the banks issue paper currency based on Mexican dollars. This currency varies in value at the different ports. I have in my pocket four bills of the Hongkong and Shanghai Banks, issued by the Hongkong branch, each promising to pay 10 Mexican dollars. The Shanghai branch of the same bank will only give me \$38.60 Mexican for four bills, which are worth \$40, thus discounting 5 per cent the bills of their own bank issued in another city. These bills would be still further discounted in Tiensin or Chefoo. This seems very odd to an American who has never been obliged to note what bank issued the bills he has from time to time been fortunate enough to have in his pocket; but in all this, there is no question of the solvency of the bank. The Hongkong and Shanghai Bank is one of the great money-making banks of the world. The fluctuation in value of these bills seems to come from the fluctuating character of a currency based on silver, aggravated in this country by the lack of speedy communication.

Ninety-nine cents gold is also equal to 1 haikwan tael, 3 mace, and 8 candereens (1.38 taels). This is the customs tael. It is never used for banking purposes, but there are at least thirteen other varieties of the tael in China. Ninety-nine cents gold is equal to 1.53 Shanghai taels, while it equals 1.39 Takau taels. The other taels range between these two in value. And yet each of these different varieties of taels represents a Chinese ounce of silver. The values I have given here are the values fixed by the United States Mint for this quarter. But the banks and large houses get the value of silver from London twice a day, and the value often varies from morning to

afternoon; and the actual value, especially at the smaller ports, varies decidedly from the value as fixed by the great markets of the world. For instance, the Mint declared October 1 that one Fuchau tael equaled 65.3 cents in United States gold, while in Fuchau, a Fuchau tael October 1 equaled 64.1 cents in gold.

Although both are based primarily on the bullion value of silver, the relation of the tael and the Mexican dollar to gold does not always vary equally. There is no coin called a tael. The tael is simply a weight, the Chinese ounce, and consequently must vary with the bullion value of silver. The Mexican dollar (coin and bank bills based on coin) is the medium of exchange in ordinary business, and an extra demand for money in any particular place raises the value of the coined dollar temporarily in that place. When the extra demand is over, the dollar sinks to its bullion value. It can be readily seen, however, that a scarcity of coined money at any particular place will add to the value of the amount available there, although business may remain at its ordinary level. The banking business throughout all the East is dominated by one corporation, which has branches in all the prominent cities. The temptation must be very great to create a scarcity of money in particular localities in order to raise the rate of interest and increase the value of its holdings in coin. This can be more easily done, from the fact that communication is almost entirely by water, and boats are both slow and infrequent.

The Japanese yen and the Hongkong dollar both circulate in a few ports, if chopped by the local banks, but they enter very slightly into the medium of exchange. It seems to me, once in a while, that the banks deliberately add to the complications of exchange. For instance, at Fuchau the Fuchau tael is not the banking standard. For purposes of computation, a Yang Ping tael is used; and to translate the value of the chopped dollar, which is the ordinary medium of exchange there, into United States gold, a somewhat intricate problem in arithmetic is to be worked out. One thousand chopped dollars equal 777 Yang Ping taels; 100 Yang Ping taels equal 133.3 Fuchau taels; a Fuchau tael equals 64.1 cents in United States gold. A European usually has nervous prostration before he finds out what his gold is really worth in chop Mexicans. When this bit of arithmetic has been solved, you still

have not arrived at the actual value of your gold. It is not always easy to find what an actual gold piece is worth in the circulating medium of China. I sent out a man this morning with \$100 in American gold coin. The bank offered him \$197.40 Mexican. The Chinese gold guild offered \$199, while the Chinese jewelry store said that they would give \$200, if the rate had not changed since 4 o'clock yesterday. At the same time, the bank asked me \$204.85 Mexican for a draft for \$100 gold on its branch in New York City.

The people who suffer from this fluctuation in the circulating medium are the wage earners. About a year ago, silver was falling in value very fast, and the shopkeepers, by a concerted movement, raised the price of commodities 10 per cent. The price of labor, however, did not advance. Again, shopkeepers raised prices 10 per cent. Still wages did not advance. Since that time, silver has gradually appreciated. The price of commodities has not, however, been lowered from the higher prices fixed when silver was at the bottom. In this country, with the value of the medium of exchange constantly shifting, all business is gambling. Even those paid in gold are badly affected by these changes. As I have said, prices are now maintained at the high level in silver fixed a year ago, when silver was lowest; but my salary, paid in gold, is worth 6 per cent less in the silver into which I must exchange it to pay my bills than it was a year ago.

Throughout the business uncertainties and troubles arising from the silver currency, I notice that the banks are the most prosperous institutions here. They charge you for changing your gold into taels and from taels into silver dollars. You must take the silver they give you; but a bank may and often does refuse to receive back the silver dollars which only a few hours before it paid out. Merchants, wage earners, and laborers all suffer by the uncertainty of exchange; but the banks thrive on that same uncertainty.

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#### SEEDLING CANES IN BARBADOS.

It is very interesting to notice how, year to year, the interest in seedling propagation increases, and the search for the best cane taken up wisely and systematically by many independent observers. It was found that the soil and climatic conditions of a single place like Dodds could not always give reliable

results as to the value of any particular seedling. The famous Sealy seedling which was raised by Mr. G. A. Sealy, and which has given such splendid results in the red soils of Mount Wilton and Colleton, is a case in point, for it utterly failed in the black soil of Dodds. Dr. Morris has established, we believe, experimental stations throughout the Island, thus carrying on and increasing the experimental stations initiated years ago by Professor Harrison, and d'Albuquerque. It is well that such good work as the propagation and feeding of sugar cane should be in the hands of competent authorities; but it is very pleasing to note that here and there throughout the Island, the private and independent observer is also taking his part in the great work of improving and rehabilitating the sugar industry. A recent visit to a farm of some twelve acres, beautifully situated on a plateau somewhere towards the East where the black and red soils mix, so as to form a soil capable of producing anything that will grow in the tropics, afforded us an object lesson of what can be done with a few acres of land when it fortunately falls into the hands of scientific intelligence. The chief feature of this farm is the great care taken of seedling canes, which are carefully planted and arranged, each one ticketed as it were with its history and performances. We noticed some ten varieties planted on their merits, on which perhaps planters would do well to keep an eye, amongst them a very famous Demerara seedling, D. 145, the best dark skinned variety we have seen, characterized by a strong and healthy growth, fairly rich in sucrose, with an average yield per acre after two years' trial of 8,860 pounds.

There, too, was 147 in all its glory, one of the best all-round seedlings yet produced, and other strong growing, freely bunching, and vigorous varieties of various shades of skin as B. 156, B. 208, D. 130, B. 109, D. 115, and B. 376. The last mentioned amongst its other good qualities is said to stand drought well, an admirable quality where rainfall is fickle.

Private experimental stations like the one described are of inestimable value; they carry on useful work, materially assist the recognized authorities, and help the planter in the practical work of selection, a very important matter, when in the busy planting season he is running about the country excitedly in search of the right plants, at the eleventh hour. Private or public plots properly conducted are a boon indeed to our

industry, and everything should be done to encourage and support them: there the planter can find what he requires without trouble, labelled and ticketed with the most recent and reliable information.—Barbados Reporter.

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*REVIEW OF THE WORLD'S SUGAR TRADE FOR 1899.*

In our issue for February we inserted the Annual Review of the world's trade in sugar. The International Sugar Journal for February gives the continuation of its report, which we also insert, as it refers to sugar countries of which little is known in our islands:

“In Australia the great event of the year has been the federation of the separate colonies. We have all along expressed the opinion that the sugar industry would be injuriously affected by the union, and it does not yet appear that the labor problem can find in a federal Parliament any other solution than one that will be prejudicial to the industry, in that it will inevitably increase the cost and also the difficulties of production. Some mitigation may be found in the adoption wherever possible, of labor-saving machinery, especially for cane cutting, but the ideal cane cutter has yet to be invented. Unquestionably the result of the difficulties created by the new situation will lead to more strenuous efforts in the direction of improvements of machinery and arrangements, and especially agricultural operations; the cane farmers and manufacturers of Queensland and New South Wales are not the men to give in or even go to work slothfully at such a conjunction. The crop of 1898 was the largest on record, the output being stated at 163,740 tons for Queensland, while that of New South Wales fell below one-sixth of that figure. Australasia as a whole (including Fiji, where the sugar industry is steadily prospering) probably exports at present some 40,000 tons to various parts outside her own borders, principally Canada and Hong Kong. The import from Mauritius has nearly ceased and there is only a limited quantity of refined beet imported. This will almost certainly be excluded under the new federal customs tariff, which has yet to be settled. The crop of 1899-1900 can hardly be expected, even under the most favorable auspices, to reach that of 1898-99. There were at work in Queensland last season 14 mills sending their juice to other factories, 60 regular sugar factories, and three refineries. One

of the central factories, owing to financial difficulties, had to be taken over by Government, and on the whole the financial position of several of these undertakings cannot be regarded as satisfactory, especially as the cost of production has increased. It is to be hoped that the very best available knowledge as regards management and chemical control may be taken advantage of; the services of thoroughly competent managers and chemists are invaluable and cannot be over-rated. The Colonial Sugar Refining Company had a successful season, but the cane now coming forward has not been up to the mark of the preceding year, owing to frost and drought and the prevalence of gum disease. The payment for cane by saccharine content was proving satisfactory to all parties. The experiments with regard to the production of beet sugar on a commercial scale in Victoria may be considered to have failed for the present.

It is probably not generally known that the area under cane cultivation in India is larger than that in any other sugar producing country. This is only natural when we consider that India is probably the original habitat of the greater part of the varieties of the sugar cane, and almost certainly the country where the manufacture of sugar first arose. But the greater part of the sugar consumed by the lower and middle class natives is of the coarsest description and manufactured by processes of the most primitive simplicity, in many cases, little if at all changed from those in use when we first hear of sugar being made. In such a country, with social and economical conditions unlike those of any other even semi-civilized country, excepting perhaps China, the introduction of improvements is a work of time and attention with much difficulty and discouragement. Nevertheless progress is being made, and as regards the refineries of Bengal and the North West Provinces efforts are being made to bring their production up to the mark of the best European sugars, which will certainly result in their being able to eventually exclude the beet sugars of which such loud complaints have been made. The prospects as regards yield and quality of the present crop are that both will be below the average, excepting perhaps in Madras. It should be mentioned that in this last Presidency there is more than one sugar factory well up-to-date and turning out excellent sugar.

In Mauritius the crop of 1898-99 was the largest hitherto

on record, amounting to over 185,000 tons; and the one now in progress is likely to exceed the average of the past five years. The principal destination of these sugars are India, Great Britain, the United States, and Cape Colony. Mauritius has the advantage of an Experiment Station, at which experiments in manuring and the growth of new and profitable varieties are carried on under competent management, and on the whole may be considered as fairly abreast of modern progress both as regards cultivation and manufacture. A special feature is the acquisition of cane-growing lands by natives of India, who are very successful from a financial point of view.

Respecting Natal, it is difficult to obtain definite figures. There are supposed to be about 33,000 acres under cane cultivation, but the production, so far as we can learn, does not amount to more than 20,000 tons of sugar. Somewhat over a year ago, a refinery was started in the colony, which has worked with excellent results, the quality of the product being equal to that of any that had formerly been imported. Probably the war cannot fail to affect the working of the estates, as a certain amount of hands will be temporarily withdrawn, but the factories, lying out of the range of operations, will not be permanently injured.

In Egypt the year has been a tolerably satisfactory one. The uncertainty as to the height of the Nile overflow, consequently of the supply of water for irrigation, and the occasional occurrence of frosts are difficulties with which all the factories have to contend. The supply of water was defective last year, hence the production will not equal that of the previous season. All the Daira factories use the mill system, but four others, belonging to the French Company, use diffusion, and claim to obtain a better result than is possible under the old system. The new factory at Baliana, belonging to the Egyptian Sugar & Land Co., Ltd., works with three mills, maceration and crystallization in movement, using the molasses in the working, and has obtained very good results. The fuel is green bagasse, with the addition of a little sun dried bagasse and some trash. More than half the Egyptian sugar this year went to the United States. Beet cultivation has been found to be a success, and the climate allows of two crops annually.

The Kehrizek factory near Teheran (Persia) has not yet done well, owing entirely to the short supply of raw material. Only

about one-fourth of the working capacity was attained. As in all semi-civilized countries, it is a work of the greatest difficulty to induce the peasant to grow proper sugar beets.

Java maintains her position as the country where the cultivation and manufacture of cane sugar is most intelligently, scientifically, and successfully carried on. All the newest inventions and processes are tested, and, if found advantageous, adopted, and the whole of the operations are carried out under able continuous scientific control and advice. The crop of 1899 reached the unprecedented figure of 754,000 long tons, that of the present year will not attain this figure, owing partly to inferior purity of the juice.

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#### *GUMMING DISEASE IN CANE IN QUEENSLAND.*

From the Manager of the Colonial Sugar Refining Company we have received a copy of the circular the company are issuing to the Childers farmers about the gumming disease. It is as follows:

The spread of the gumming disease in the Childers district demands the serious attention of the farmers who cultivate cane there. During the last few weeks the proportion of gum present in the cane juice has notably increased, the effect being that the yield of sugar has fallen off to a considerable extent, and recently in one week the value of the sugar produced at Childers was less by £350 than that which we ought to have obtained from sound cane having the same content of sugar. This is equivalent to a loss of 1s. 6d. to 1s. 9d. per ton of cane crushed, and though we are content to bear such loss ourselves this season, because so much of the cane is being bought at a fixed price, we cannot hold out the hope that in future years cane that is thus affected by disease will be deemed by us "sound and fit for manufacture."

There is another point, too, which should be noted by the farmers concerned, and this is the probable serious fall in the yield, as well as in the sweetness of the cane, if nothing is done to obtain stronger varieties of cane, or to check, by selection of cuttings, &c., the spread of the disease. On the Clarence River, in New South Wales, the gum was first noticed in the mill to a marked extent in 1893, the consequence being that there was a considerable fall in both the yield of cane and the percentage of sugar, and the extent to which the cane

depreciated in value in the following three seasons of 1894, 1895, and 1896, when the disease was in as acute form, will be readily appreciated from the fact that during this period the quantity of cane required with the average return for the two years of 1891 and 1892, immediately preceding the breaking-out of the disease. Figures cannot be given for the loss sustained by the farmers through the diminished yield of cane from fields affected with gum; but this was, in many instances, so serious a matter—a number of crops failing altogether—that premature plowing-out had to be resorted to, while, when replanting, the old varieties of Rappoe and Mauritius Ribbon were, for a time, and in some localities are still, abandoned in favour of gum-resistant kinds. What with this change, and the rigorous selection of cuttings from healthy stock, and the adoption of other safe-guards, the disease has, in a large measure, been got under; and the returns for the last two and the present seasons, though not yet up to what could be expected if the stock were perfectly healthy, are sufficiently encouraging to show that the disease is, to a large degree, subject to control.

It would be a matter for much regret if the neglect of due precautions against the spread of the disease causes a repetition at Childers of the heavy losses experienced on the Clarence, and every observer who has noted the progress of the outbreak in the latter district will admit that there is great danger of the crops in the Isis being affected in a like degree.—Queenslander.

EDW. W. KNOX, General Manager.

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*CANE CULTIVATION—CONSIDERED IN ITS VARIOUS PHASES.*

(A paper by Capt. Geo. E. Mann, read before the Louisiana Sugar Planters' Association February 8th, 1900.)

“Given one-third plant cane, one-third stubble, and one-third corn, with an average season, how many acres should one team be expected to attend properly, under (1st) ordinary mixed plow and disc cultivation (2nd) modern surface work with cultivators exclusively. Also, how many acres one hoe hand should tend under like condition; with an incidental discussion of stiff versus light land, negro versus Sicilian labor, and

large versus medium sized mules, as affecting the main issue."

To do justice to this far reaching topic, many pages would have to be written, owing to the fact that different conditions demand different treatment. Not being highly versed in letters, nor having had sufficient time to devote to this paper, I shall confine myself solely to the work of introducing this evening's theme, expecting thereby to draw out discussion and debate, from which deductions can be drawn, useful and valuable to all, but particularly so to those who still pursue the old costly manner of producing cane crops, and, who have kept up because they were the fortunate possessors of the most favorable soils adapted to cane culture. The different localities, the variety and condition of the soil, the quality of labor and mules, the good condition of and the most proper implements, and, last but not least, the energy practically displayed in the fields, and not alone possessed by the managers, all has materially to do with the successful outcome of cultivation, but these points combined, are seldom found.

The use of the ordinary mixed plow and disc cultivation on stiff and particularly on flat stiff lands, would be nearly prohibitory, because of outlay and results, and success can only be derived on well ditched and well drained lands by every persistent practice of, first, breaking up the soil in *never* anything but a dry state, and, secondly, by a regularity of securing every third year a heavy crop of cowpeas, which should be ploughed under when about beginning to mature. In such a state, the ground will keep porous and the expense of cultivation be but little more than on sandy land, the difference being the additional care of two more mules during fall ploughing and against the spring, prior to the use of double mould board and subsoil plows and cultivators. It might not be amiss to acknowledge right here, that this additional use of mule power on stiff land is found to be very desirable on all kinds of soil. Under such conditions 10 acres of stubble cane, and 10 acres of cowpeas can be properly tilled with one team on stiff lands, as against 11 acres of each on sandy land.

During an average season, the practice of modern surface work with cultivators exclusively, can be more successfully conducted by keeping the cane rows  $5\frac{1}{2}$  feet apart, using first, the small shovel cultivators, then the smaller disc, followed at times by the discs being separated enough to take in the

middles, and finally using the largest of discs for laying by the crop. Fifteen acres each of plant, stubble cane and corn with peas, could be readily and properly cultivated, and this last manner of cultivating cane crops will ultimately be adopted by most planters, it being the least expensive, although for stiff lands I would consider the additional use of subsoil plows imperative, the benefit obtained therefrom during prolonged droughts being great as this draws the moisture easier, and it would also have a tendency to lower any excessive moisture more rapidly from the roots of the canes. It would require six hoes to take the place of one cultivator when plows only are used for cultivation; the situation without plows and without cultivators is too impracticable to deserve mention. Negro labor is preferable for ploughing, teaming, cutting of cane and ditching; Sicilian labor is better adapted for hoeing and cutting cane, and only the old negroes, boys and women will do the hoeing now; Sicilians will make more time than negroes, and they will make good ploughmen if taken in hand when young; both races are necessary, and the efficiency of Sicilian labor depends a great deal on the patience and justice accorded to them when freshly arrived in this country. One should never neglect discipline with them. If allowed to work in company with evil disposed or lazy countrymen, who have been here a number of years, they can then never be depended upon, and they will prove a constant source of annoyance to the management, and it is soon found best to make an entire change as early as possible.

Sandy lands can be tilled with mules 15 to 15½ hands high and weighing 1,100 pounds; stiff lands require larger and heavier animals, according to the condition of soil. When once the ground is gotten in proper shape, it will not be necessary to employ the heaviest mules; the same is applicable in the use of cultivators, a cultivator of light draft not needing by far as large a team as a cultivator of heavier draft.

In conclusion I will state, that when stiff or sandy lands are kept constantly as above described, it is preferable to plant all canes in the fall, and two canes, even if they have been raised with cowpeas, are ample to secure a good stand for fall planting purposes, but above all, it is important, and in some instances positively necessary, that all lands to be planted should be fall ploughed as early as possible. But where lack

of teams make this impracticable, or where lands are not to be finished, or in case a wet season interrupts this work, it would be advisable to wrap the middles with six mule plows until done, they break out the balance of the ridges, thereby securing the greatest benefit of all the available valued properties of that greatest of fertilizers—the cowpea.—Louisiana Planter.

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#### AMERICAN TRADE IN 1899.

It was a grand year. Prosperity found its way into every nook and corner of the United States. New gold fields of exceptional richness were discovered along the coast of Alaska, and new channels for commerce along the coast of Asia. American manufactures found new and rapidly-growing markets in every continent; American bridge-builders were as quick to make a contract to bridge a river in Africa as at home; American locomotives are finding their way into all countries, more than one thousand having been exported in two years, besides nearly fifteen hundred stationary engines. It is estimated that 2,520 locomotives were constructed in this country during the year. The Railroad Gazette puts the number of cars built in this country during 1899 at 123,893, or nearly 20 per cent more than in 1898. Over 4,500 miles of railway track were laid in 1899.

The exports of manufactures of iron and steel have increased about 60 per cent in two years. If we take the small item of rubber boots and shoes, we find that the exports in 1899 increased 25 per cent over 1898 and 60 per cent over 1897. China, India, Siberia, and Africa are taking American goods in fast-increasing quantities, thus insuring greater stability to the manufactories of this country and better prices for all agricultural products.

The year's foreign commerce will probably be the largest on record—exceeding the \$2,000,000,000 mark. For ten months ending October 31 the imports and exports of merchandise were \$1,686,282,076. The imports and exports of gold and silver were \$144,533,547.

The total resources of the National banks of the United States were over 50 per cent greater in September, 1899, than in the same month in 1891, when the number of banks was 97 greater.

The business of the country, as judged by the Clearing House returns, surpasses any former record. During the hard times in 1894 they dropped in New York to less than nineteen hundred millions, while in October, 1899, they exceeded fifty-two hundred millions. Outside of New York banks, clearances are one thousand millions greater than in 1894, 1895, 1896, and a good part of 1897. For the year 1899 they exceed 1898 over 36 per cent and were 51 per cent ahead of 1892, a year of great prosperity.

The transactions on the Stock Exchange passed all former records. The sales of stocks were 175,053,835 shares; of bonds, \$836,000,000, the latter being smaller in volume than in 1898.

The number of failures up to December 1 were lighter than for many years, and the liabilities smaller. Unfortunately, heavy failures in Boston and New York marked December, as the result of overspeculation in industrial stocks and a manipulated money market during a period when money is usually tight.

The year was a record-breaker in the magnitude of trade done by distributors of food, both wholesale and retail. Let us hope that balance-sheets will show handsome additions to profits. So far as preserved foods are concerned, the year 1899 beats all former records. There was the largest pack of salmon and of tomatoes on record; a heavy output of corn. The distribution was active throughout the year, which closed with stocks in first hands lighter than ever known at the close of December.

Never has labor been so well employed as during 1899, nor at so large wages.

During the latter half of 1899 the number of new textile mills started in the United States was 183, against 107 for the corresponding period in 1898.

The outlook for 1900 is of the most flattering character. Nothing but some unlooked-for disaster or tremendous calamity can check the present era of prosperity. If Congress passes the New Currency bill, making gold instead of coin, the standard of value it will add much to general confidence in the future.

The detailed reports which follow show the course of prices for the year in comparison with former years.—*Am. Grocer*, Jan., 1900.