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The index to the contents of volume fifteen, for 1896, will be found inserted with this number.

Thrum's annual for 1897 has been received as we go to press, and, as usual, it is filled with interesting statistics and data relative to Hawaiian affairs. In our next issue we shall refer to it again.

In the State of New York it is no longer a legal requirement that a note or other evidence of debt shall bear the words "For value received." A note, check or other instrument dated on Sunday is not illegal, as was formerly the case.

Enormous oil fields have been discovered in Sumatra, the quality is excellent, and as the oil can be easily shipped, the Dutch owners can sell at a very low rate. For the present the Sumatra oil will go chiefly to Japan, a country which took over 30,000,000 gallons from America last year.

No one can live a gormandizing, sordid, or licentious life, and still wear a countenance hallowed and sanctified with a halo of peace and joy. The whole face puts on mourning for the death of self-respect. Vicious companions will very quickly transfer their wicked expressions to the faces of their victims.

The price of sugar in New York has declined since our last issue, and the latest quotation at hand is $3\frac{1}{4}$ cents for Cuban centrifugals of 96 deg. test. The total stock of sugar in all countries, Dec. 17, as given by Willett & Gray's Sugar Statistical, was 2,328,053 tons, a small increase over the stock on hand at same date of 1895.

It is very difficult to keep soils fertile if they contain a large proportion of sand. If they are kept under cultivation this difficulty is increased, as the sand both blows and washes when exposed to winds. For this reason many owners of sandy fields keep them seeded with grass or clover as much as possible, only plowing them when the seeding runs out.—Am. Cultivator.

We are in receipt of a copy of Bouchereau's Louisiana Sugar Report for 1895-6, an annual which is always overflowing with statistics relative to sugar, not as regards Louisiana only, but the world's cane and beet crops. This periodical each year becomes more valuable as a reference book, and should it in future embrace statistics relative to the cultivation and outcome of the beet sugar industry of the United States, it will become still more acceptable.

One of the noted changes in plantation management for the coming year, says the Louisiana Planters' Journal, will be that of Mr. Geo. M. Booth, for years the successful manager of Col. James S. Webster's Terre Haute plantation, in St. John's parish, who goes next year to the Hawaiian Islands as manager for the great sugar king, Claus Spreckels. Mr. Booth's many friends, while exceedingly regretting that he leaves Louisiana, congratulate him on the deserved promotion. He will there obtain a handsome salary, far in excess of what Louisiana planters pay.

A circular from Dr. Wm. C. Stubbs states that the Audubon Sugar School, heretofore conducted at the Louisiana Sugar Experiment Station, Audubon Park, New Orleans (one of the stations of the State University) and which was temporarily suspended last July, will be reopened upon a more extensive scale by the Louisiana State University and Agricultural & Mechanical College, at Baton Rouge on January 4th, 1897. The classes will spend the grinding season at the Sugar Experiment Station, New Orleans, where in its splendidly equipped sugar house, they will be taught practical sugar making and chemical control.

A fine specimen of coffee grown from Guatemala seeds, was received at this office, says the Hilo Tribune, from Mr. J. M. Horner's plantation at Kukaiau, from a four year old tree, which had upon the one primary received nearly 900 well developed coffee cherries, and there were forty such primaries on the same tree, fully three-quarters of a pound to the primary. Some of these primaries Mr. Horner informs us had 1000 cherries, and says he will have twenty-five tons of coffee this year, and were all his trees from Guatemala seed he would have sixty tons from his plantation instead of about thirty tons. That is the way he replies to the difference and selection of seed. Side by side the Guatemala and wild coffee trees are growing, and the former produces eight times the amount of the latter. The growth of wood is in favor of Guatemala by long odds.

The Ewa plantation has recently increased its capital stock two hundred and fifty thousand dollars, making its present capital one million dollars. The new issue has been expended in the purchase of pumps and machinery for irrigating 1200 acres of rich land lying above its present fields. The growing crop, now being harvested is expected to yield 13,000 tons, or one thousand tons more than the previous crop. When the new pumps are erected, and the new fields cropped, the annual output will probably not be less than 15,000 or 16,000 tons. When the discovery of artesian water was made on the site of this plantation twenty years ago, no one ever dreamed that the

supply would prove to be so extensive or so valuable as it has been. It has been suggested that there may be some chemical ingredient in our artesian water, favoring the increased production of sugar from soils irrigated with it.

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THE OAHU SUGAR COMPANY.

Two years ago, Mr. B. F. Dillingham, president of the Oahu Railway Company, issued a prospectus for a new sugar plantation, on land belonging to the company located near the Ewa Plantation, and only twelve miles from this city. It proposed the organization of a company with a capital of \$1,800,000, and the prospectus was published in this journal of January, 1894. The estate covers over ten thousand acres of choice arable land, but is in a rainless district. The scheme of turning this arid tract into a fertile sugar plantation with artesian water only, was looked upon by many as visionary and impracticable, because it required millions of tons of water to irrigate the growing cane, to be raised from artesian wells to a height of from 100 to 600 feet above the level of the sea—an undertaking that had never yet been tested in any country.

After a thorough investigation of the project, and hearing the opinion of able engineers, who demonstrated the practicability of raising the required supply of water, a lengthy article was prepared by the editor of the Planter, and published in this monthly, November, 1895, endorsing it and advising that it be undertaken, and furnishing ample data to support the opinion expressed in it. Since then, the plan has gained many strong supporters, and the result has been the formation of a company to carry it into operation, with the capital named above, \$1,800,000. The agents of the new enterprise are the old and wealthy firm of H. Hackfeld & Co., who have been established here for about fifty years, and take half a million of the stock, the balance having been eagerly subscribed by residents of these islands.

The powerful hydraulic pumps and engines, with the ponderous mills and sugar house machinery are now being, or will soon be, manufactured in the United States—all to be of the

finest and heaviest work of the kind that has ever been constructed. In fact the entire outfit of this great establishment, including shiploads of Pacific coast lumber, and all the machinery and other equipments—costing over one million dollars, will be American product and manufacture—furnishing one of the strongest evidences that could be desired, of the benefit to American artisans and laborers, and the value to America of the Hawaiian reciprocity treaty with the United States. The capacity of this vast enterprise will be twenty thousand tons of raw sugars annually, after the year 1900.

Among the many advantages which this new enterprise possesses are, first, its proximity to Honolulu and its port—only twelve miles or one hour by rail from the mill to the dock, where a ship can be loaded with one handling of the sugar, and in one day, if necessary. And when Pearl Harbor is opened to commerce, a four thousand ton ship may lie alongside the company's warehouse in thirty feet of water, and receive her cargo.

2.—The entire tract reserved for the plantation consists of clear land, without trees or rocks, having a gentle rise of say one hundred feet to the mile; sufficient to secure perfect drainage and easy irrigation. Added to these prime requisites is a southerly slope of the tract, the very best for the production of sugar cane in perfection.

3.—The area of the estate is over 10,000 acres, part in fee simple, and the rest under a lease of sixty years, with privilege of purchase. The large extent of land will allow of frequent rotation of fields.

4.—Cost of transportation of sugar from the factory to San Francisco, New York or to any other port, will be less by one-half than from some inland sugar estates, which reship three times, often with losses before reaching the refinery.

5.—The magnitude of the enterprise will enable this company to turn out a larger quantity of cane sugar at a smaller cost than has ever been done here or perhaps elsewhere.

With all these advantages, those who are so fortunate as to secure an interest in the Oahu Plantation, may rest assured that it will eventually prove to be the very best gilt-edge invest-

ment that Hawaii can furnish, and far better than any mining or land ventures in other countries. We congratulate Mr. Dillingham and his associates on the success of their labors, and the Republic of Hawaii on having the prospect of possessing the best up-to-date cane sugar factory to be found in any country.

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IS OUR SUGAR CROP "BIENNIAL."

In the Dec. 5 issue of the Louisiana Planter the editor calls attention to Dr. Maxwell's official report of our Hawaiian sugar crop of the last two seasons. After noting the "extraordinary increase in the last crop over the previous one," he continues, "Dr. Maxwell calls special attention to the biennial character of their cane crop, claiming that some canes twelve to fifteen months old are still cultivated, and are irrigated still longer, to within two months of cutting, thus necessitating far greater expense than if the crop were annual. This contention of Dr. Maxwell's seems well founded, and we are disposed to admit its accuracy, but certainly their sugar crop is an annual."

We believe that our worthy contemporary is misled by the idea that because we have an *annual output* our crop is therefore an annual one. This error easily happens to persons located in countries, like Louisiana, where the crop, as well as the output, is annual. It is strictly correct to maintain that the islands have an annual output of so many thousand tons of sugar.

To show, however, that our crop is not *annual* we may remark upon the crop harvested between Dec. 1, 1895 and August, 1896. The ground for the planting of that crop was being prepared several months before the time of the actual planting of the seed, which latter took place between, we will say, March and September of 1894, the planting season, like the grinding, being spread over a considerable length of time. Now, it must appear to all that a crop planted in 1894 and harvested in 1896 cannot be an annual.

As a consequence of the biennial nature of our crop we have

always two crops and sometimes a part of a third, on our hands together. This is necessary if we are to have an annual output from a biennial crop. Dr. Maxwell's report says, "the number of acres of cane manufactured in 1895-96 was 55,729." There was, however, another similar acreage of cane on the ground, which at that time was only half-grown, and which we are now just beginning to take off. These facts more than justify Dr. Maxwell in emphasizing the great cost of production of an acre of cane with us, as compared with the cost of cultivation in countries having annual crops. This great cost is not only made up by the prolonged acts of cultivation, and expense of labor which it appears, Dr. Maxwell has called attention to, but also by the fact that the crop has to bear two years' rent of the land; two, and occasionally, three years' taxes; and, what is more, two years' investment of capital before any return is made. The two years' occupation of capital before returns are seen makes sugar growing in these islands a very heavy undertaking in comparison with Louisiana, where the capital is turned over every year. The Louisiana Planter, and also other sugar journals, have frequently called attention to the large capitalization of Hawaiian plantation companies. They now find an explanation of the facts which they have observed in the biennial nature of our crop, and the consequent cost of its production, that Dr. Maxwell has set forth.

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HAWAIIAN RECIPROCITY AND CONTRACT LABOR.

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On previous pages reference is made to the strictures of the Louisiana Planter of Dec. 5, on the biennial feature of Hawaiian sugar crops, as compared with the nine-months crops in Louisiana. Not less deserving of notice are its remarks concerning the reciprocity treaty, "under which the Hawaiian planters "buy their supplies where they please, and send their sugar in to "us free of duty, while we produce sugar with our higher grade "and better paid labor, and get all our supplies from American "manufacturers, who are generally better protected by existing "duties than we are."

The object of the Hawaiian reciprocity treaty, as with all similar conventions, was to secure to each nation the bulk of the export and import trade of the contracting parties, and thus render them more dependent on each other for such products as each can best produce, thus stimulating the industries of each other. This result the treaty has actually produced. While Hawaii, in making it, conceded every item which the United States asked to be exempted from duty, and consented to admit free nearly all her manufactures and soil products, Hawaii was refused many items which she desired to have included in the free list. The result has been that the United States has secured four-fifths in value of the total annual importations into Hawaii—the product of American manufacturers and farmers. She has also secured nine-tenths of the ocean carrying trade of these islands. In short, under this treaty, Hawaii has become a commercial dependency, if not practically a protectorate of the Great Republic, having granted to her the exclusive right to the most valuable harbor in the entire Pacific Ocean, for the possession of which, almost any of the first-class powers of Europe would be willing to pay a very large sum. This may be only a side issue of the treaty, but it possesses importance in discussing its merits—a convention to which each year is adding increased value.

The Louisiana Planter says: "With their climate, their indentured or semi-slave labor," &c. Our climate needs no apologies from us. The beneficent Creator provided it for some wise purpose, perhaps to become the future Garden of Eden, for America's wise and good men and women, when the borders of the Great Republic become too limited to afford them a longed-for retreat. If He has made this the finest climate in the world for raising sugar and coffee, we sincerely thank Him for His goodness; and the American people will do the same, should it ever become a coveted appendage and outpost of the Great Republic, which we devoutly pray it may.

But the re-vamped charge of "semi-slave labor" demands notice. There is no slave labor on Hawaii. When a slave touches Hawaiian soil, he is free. Every man on our plantations is a voluntary free laborer. When he left Portugal, the

Azores, Japan or China, he left voluntarily, not forced. He landed here voluntarily. He entered knowingly, eagerly and voluntarily in a service where he knew just what he has to do, for which he receives at the end of each month just what he agreed for—from thirteen to twenty dollars in American gold coin or its equivalent—a coin he had never seen before, but like many true Americans, believes it to be the best ever minted. At the end of his term of service, he finds (if he has provided for it), a gold deposit in his favor, and with it returns to his country, a lordling among his neighbors whom he left three years before. Many of these men reshipe on the same or another plantation, as they prefer, generally at advanced wages, according to their merit.

Now if this is "semi-slave labor," then every sailor in the American navy, or merchant or whaling service, who voluntarily ships on a one, two or three years' service or cruise, under a written indenture or contract, and in the event of trying to desert or escape in a foreign port, is hunted down as a deserter, is a "semi-slave," and the system which binds him to such service is semi-slavery, sanctioned by American laws of many years' standing.

The truth is, in this matter of voluntary contract service or indenture, it prevails in some form in almost every country. In large enterprises, involving a vast outlay of capital, where a constant supply of skilled and unskilled labor must be maintained, voluntary contracts are a necessity, and are constantly resorted to in some form. Here in Hawaii when a contract laborer becomes dissatisfied or troublesome, as a rule he is discharged, and when not in arrears, returned to his country, and his place is filled by another. Of late years, there has been very little trouble with laborers, as their consuls reside here and are always ready to investigate any complaints. A labor system which equitably guards by just laws the rights of the employed as well as of the employer, cannot be termed semi-slavery.

In Thrum's annual for 1897, page 31, a table is given, showing the number of laborers on Hawaiian sugar plantations as follows:

Hawaiians	1,584
Portuguese	2,499
Japanese	11,584
Chinese	3,847
South Sea Islanders	133
All others	473
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Total	20,120

Of the above, 8,835 serve under contracts of one, two or three years. Of these, 522 are Hawaiians, 420 Portuguese, 6,602 Japanese, 1,203 Chinese, and 88 South Sea Islanders.

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CLEANING JUICE IN SUGAR MILLS.

Editor Planters' Monthly:—There have been a great many methods of cleaning the juice after it leaves the clarifiers, all of which are more or less expensive, and unsatisfactory—indeed in some mills almost enough steam is used, for this purpose, as is used in the triple effect, to evaporate the juice, to a density of 30 B., and to obviate which the bag, sand, and vacuum cleaners were introduced, and various other methods, all more or less expensive and troublesome. But now, after all this experimenting, a great many of the manufacturers are coming to the conclusion that very good results may be obtained without any cleaning at all, other than it gets in the precipitators or settling tanks.

From the appearance of things at the present time, it seems that juice cleaners will soon be a thing of the past, and no one will regret it. This method to my own personal knowledge, has been in practice, on these islands, as far back as ten years, and possibly very much longer.

It is also learned that no very great difference is found, in juice that is cleaned, from that which is not cleaned. At least, it does not show, to any perceptible degree, in the polariscope after the sugar is made, nor even in the boiling of it. This knowledge will, I believe, be a great boon to many places that are short of steam and cleaners; and there seems no reason why this change should not be adopted and come into general use all over the islands. There is another new departure, and

that is in taking the low grade sugar into the vacuum pan just as it comes from the machines, and without diluting it in the clarifiers or cleaners. This method it is claimed, is far ahead of anything that has been in practice up to date, and at the same time saves a large amount of labor. By this method the sugar is merely put into a hopper and the vacuum draws it into the pan. But how far it will lift it, is a question that has yet to be settled. But this is not of much consequence. The main thing is to know the actual gain of this new method.

Another new departure is seen in the design of triple effects. Formerly it was the custom to place the largest effect, or cell, last; but the new cell that has been added to the double effect at Kukaiau sugar mill has been placed first; and it is claimed that this change makes the triple effect much more effective.

Smith's cane cutter or leveler is also growing in favor, and almost all the mills of this district have adopted it.

Messrs. J. M. Horner & Sons at Kukaiau, are now erecting a new style of cane carrier, for transporting the cane from the fields to the mill. It consists of a wire rope, poles, wheels, etc. The poles for supporting the wire rope will be placed about 1000 feet apart, and the arm which holds the rope will be placed just high enough to allow the cane to clear the ground. There will be but one wheel and hook used for a load of cane, which descends by gravitation.

Kukaiau, Hawaii.

G. O.

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*DR. MAXWELL'S REPORT REVIEWED BY A
PLANTER.*

Editor Planters' Monthly:—As I was not able to be at the planters' meeting, I would like to make a few remarks upon Dr. Maxwell's four reports recently prepared for the planters' meeting, and which deserve to be read with careful attention.

The first report deals with soils. Up to the eighth page, we have the comparisons or the differences of the soils of Hawaii placed side by side with those of the other islands of the group, Hawaii reaching far ahead in the element of nitrogen, but falling as far short in lime.

The report takes up this matter again on page 16, with a promise of further examination.

The data so far brought to light, confirm observations made years ago; viz: that the climatic conditions peculiar to that district, and the feeble amount of lime in the soil, point, without doubt, to the probable benefit which might be expected from its application, either in the caustic or carbonate condition to the soil.

From page 8 to 16 we have a series of facts brought before us, relating to the absorption and retention of water in soils which should be frequently referred to by all interested in raising cane by irrigation.

Other observers have, as Dr. Maxwell points out, examined the first part, but few, if any, the second. It seems that those who have been most benefitted by the application of water by irrigation, are most liable to forget that it is possible to waste water, labor and the soil's fertile constituents by over-doing it.

A cane suffering from want of water or from an excess of it, does not differ materially in appearance during the earlier stages of the trouble and many of us could enumerate occasions when, deceived by the superficial dryness of the soil, we have applied water to the detriment of the cane. This in our climate is more liable to take place during the months of January, February and March, when the cold, dry winds rapidly dry up the surface for two or three inches, while below that the soil is wet and cold.

The next thirteen pages are full of useful matter concerning cultivation, which I must pass over, however, and touch upon the next report, viz: Fertilization. Sixteen pages are given to this subject—perhaps more important to us than all the other subjects put together. A paragraph on page 32 practically sums up Dr. Maxwell's views on this subject. I quote it in full: "We personally, after noting the action of given fertilizers in the field and upon a scale covering areas upon all the islands, find our statements of last year amply confirmed, and are now without doubt that nitrogen is the particular need of the cane crop over practically the whole of our soils, and, moreover, that the form in which the nitrogen, phos. acid and

potash contained in the fertilizers are present, meaning the measure of their solubility, very largely determines the values of fertilizers in our several kinds of soil and under the dissimilar weather conditions."

I think it is principally because of the "dissimilar conditions" that different results are obtained amongst us from the application of the same materials. Dr. Maxwell is right in his preference for sulphate ammonia instead of nitrate of soda, but he errs somewhat in stating that sulphate ammonia has only recently come into use among us. I fancy he intended to say that nitrate of soda is a recent article here, for sulphate ammonia has been used to my own knowledge nine years ago, although only up to about 250 pounds per acre in conjunction with other elements.

Nowadays we can show fields where much more per acre is being used to great advantage. This is, however, rightly left to the question of profit and loss, and must be found out by careful trial. Many of our soils show the presence of soda as common salt and for this reason also sulphate ammonia is in my opinion preferable. It is better suited to heavy lands, while nitrate of soda does well on thinner soils. In some of our manures I have used part nitrate of soda and part sulphate ammonia conjointly, and have the opinion that nitrate of soda favors deep rooting, while the action of sulphate ammonia remains, for a time at least, nearer the surface. The action of both these nitrogenous manures in our compact soils is augmented by the presence of a good dose of carbonate of lime from finely ground coral rock.

From our point of view the question of nitrification in acid or alkaline media may remain, as Dr. Maxwell puts it, open for more information and so also the other point incidentally stated, viz: whether plants other than the legumes can assimilate free nitrogen from the atmosphere or not.

We do know, however, that the soluble phosphates are eagerly seized upon and detained in an inactive state by the sesquioxides of iron and alumina so abundant in our soils, unless a suitable amount of lime be present in the carbonate condition, and I do not believe a trace of carbonate of lime will be found

in 95 per cent. of our cane lands. The lime that is found by analysis in our soils may be sufficient for the requirements of the cane, but it is neither in the combination or the quantity sufficient to keep our land in the best condition for utilizing the manures we may add to them.

Dr. Maxwell's remarks on pages 43 and 44, could, I think, be applied to nearly all the cane lands of other districts as well as to those he specially selects.

The Report on Manufacture touches the question all round, and should be read in connection with the mill data for critical purposes.

It would be well if all such data could be started from the weighing scales for the cane, and methods of controlling the work as it proceeds be as nearly similar as possible.

Dr. Maxwell has given 18 gallons waste molasses per ton of sugar as the average in our works. This, I think, is rather high, seeing there are only four diffusion plants on the islands, in which we admit freely the molasses per ton of sugar exceeds that from roller mills very much. I know it has been as low as ten gallons in the Spreckelsville mills some seasons, and I have no doubt that many others could furnish a similar record.

Perhaps this figure has risen correspondingly to the extra roller extraction claimed now-a-days by the majority of our mills. It might be easily questioned if it will pay to push the extraction from the cane any further than it now is, for the purity of the juice, after 78 per cent. of the cane's weight in normal juice, descends alarmingly fast. The questions we have to follow up in the future in the mills are economy of heat and labor, and confining the work of sugar making into the period when the cane yields its maximum of sugar. Perhaps we are a long way off from this last point, but I think that is the direction we are making for, as Dr. Maxwell shows, and his figures can be verified, ten per cent. more value in the cane in May and June than in January and February, is too big a consideration to be left entirely neglected very much longer.

I may say, in conclusion, that Dr. Maxwell's reports are the most complete and instructive so far presented to the Planters'

Association, and that all interested in the sugar industry can read them with great profit.

Yours respectfully,

H. MORRISON.

Makaweli Plantation, Kauai, Nov. 30, 1896.

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FRAUDULENT FERTILIZERS AND AGRICULTURAL EXPERIMENT STATIONS.

Very few persons appreciate the great value that agricultural experiment stations have been to the agricultural world in the one direction of suppressing frauds in fertilizers. We have in mind one particular high grade fertilizer that some ten or twelve years ago was extremely well thought of by some of our leading sugar planters, and considerable sales of it were made in this State at \$45 per ton. When under the influence of the teachings of our own agricultural experiment stations, under the control of Dr. Stubbs, we began to learn that the content of phosphoric acid and of nitrogen were the chief elements of value to us, the inquiry was directly made to the manufacturer of this special fertilizer as to what per cent. of available phosphoric acid he would guarantee. He replied that he would not make any guarantee, but sold his fertilizer on its merits. Of course, that wound up the business so far as the writer was concerned, and no more \$45 per ton high grade phosphates were bought.

We have now a report from the New York Agricultural Experiment station at Geneva, discussing a fertilizer that has been recently pushed in that State under the title of Natural Plant Food, which has been found to be a great fraud and dependent entirely for its success upon the energy of its producers and the gullibility of its consumers. It was sold to farmers at from \$25 to \$28 a ton, and the investigations of the New York station have brought out the fact that it was simply a mixture of raw Florida phosphate and green sand marl, a liberal estimate of the value of which would be \$10 per ton.

In these days when all agriculture is so much depressed, it

seems too bad that the farmers should be swindled with fraudulent fertilizers, and it is fortunate that our various experiment stations can be so readily availed of and the true value of all the fertilizers offered to us be thus readily determined.

We do not mean by this to speak in the slightest degree against the theory of liberally fertilizing all of our crops. Unquestionably modern agriculture demands that the soil should be liberally fertilized if we are going to carry on profitable agriculture. The same report of the New York station indicates that most of the fertilizers offered for sale in that State, and which were subjected to analysis by the station, were found to be all right in every respect. It unfortunately happens, however, that the fraudulent fertilizers are frequently the ones the most vigorously pushed upon the unsuspecting consumer, and it is well that the consumer's attention should be frequently called to the danger of imposition by these frauds and to the great value of the Experiment Stations in the protection that they give us from these frauds.—Louisiana Planter.

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We have heard of several sugar estates, says the Demerara Argosy, the proprietors of which are selling sugar to their resident laborers and the laborers of the district in general, at the low price of two cents per pound; but this week we have heard of one proprietor, who is selling dark crystals sugar at two cents per pound and dark molasses sugar at *one half-penny per pound*. We place this on record, knowing the information to be correct, and believing this to be the lowest price sugar has ever been sold for, in retail quantities, in this or any other country. Sixteen years ago when sugar magnates were declaring that it was impossible to make sugar at a profit for five cents a pound, Mr. Field of Great Diamond estate, assured us (in confidence) that they were all wrong. "Take my word for it, sugar can be made for £20 a ton; but of course at a very small margin of profit." If these old departed heroes were to return to their sugar fields today and find sugar being sold retail at a half-penny a pound, they would be so staggered and disgusted that they would hasten to get back to Spirit land. But, although the Berbice planter in question is selling sugar at a cent a pound, it must not be assumed that he can produce it for that sum. We do not say he cannot; but we have never heard of anyone who could; and if the way to make sugar of any saleable quality at that price has been discovered, the history of cane sugar will not be brought to a close just yet.

CANE JUICE CLARIFICATION AND SUGAR MANUFACTURE.

Mr. T. Daigle writing to the Louisiana Planter, alluding to Dr. Walter Maxwell's contribution on the clarification of cane sugar juices (published in a recent issue of Sugar) says: Cane juice clarification is certainly the most important but intricate question in the manufacture of sugar—now that the extraction of the juice is effected almost to its maximum.

It is said: "There is nothing so valuable as practical knowledge in the world, connected with experience, theory and science."

We have now, and have had learned men of all nationalities studying and investigating these important problems of the sugar question through all its phases—in its culture, extraction and manufacture, including the tropical cane and Louisiana cane. Having cultivated both and manufactured the sugar from them, I find that the tropical cane, as selected and reduced to three varieties (not barring other superior varieties adapted to particular localities), the Bourbon, the Red Ribbon and Otaheite, by eminent chemists, competent planters and sugar makers—is very superior in value and qualities. When we consider the great yield of these three varieties—five, six seven and eight thousand pounds of sugar per acre, we must admit that they are (par excellence) the good selection as choice. These canes being produced by the simplest, most economical planting and culture; the extraction effected the usual way by pressure.

But we are on the question of cane juice clarification: It is what we are coming to. The juice in this great yield gauging 10 deg. Baume, to which was obtained by good clarification, or complete elimination of foreign substances, by the proper use and in connection and in due proportions of lime and sulphurous acid.

Lime and sulphurous acid as clarifying agents are the two most important substances to be used in our sugar houses (on any scale), provided they are used in proper and given proportions to each other, and to the amount of juice to be clarified,

and according to the nature and quality of that juice, which should be ascertained and judged by the sugar maker or chemist, or whoever has charge of the same.

However, it must be remembered, that, when we come to Louisiana cane juice (our red cane and red ribbon cane from the tropical purple bourbon and red ribbon), we are not treating tropical cane juice. Our two varieties of canes yield also a large tonnage, and in many instances 3,000, 4,000, and 5,000 pounds of sugar per acre. I have obtained this yield in their culture and manufacture. And I have often made sugar in different localities in Louisiana, where similar results were realized from these two varieties of canes, which prove that we can rest satisfied on the score of superior qualities of our Louisiana canes as to yield in quantity and nature of products, if we do not make them degenerate by injudicious planting and culture, which should be carried on by fixed rules and principles, involving many conditions so often overlooked by the sanguine planters, who expect to force nature to yield her bounteous gifts instead of assisting her to develop her unbounded resources in favor of those who sow to reap a bountiful harvest.

When we come to Louisiana cane juice, we are not treating tropical cane juice. The variability of the Louisiana cane juice is the stumbling block of sugar makers and even to chemists, particularly to foreign chemists accustomed to work beet juice. Most of that variability must be credited to difference in planting and culture, to changes in the soil and application of fertilizers, hence delayed maturity.

Still, in some instances, changes in the soil will affect the clarification of the juice materially, notwithstanding the perfect maturity of the cane and other good qualities which it may possess as a standard cane. I have worked cane juice from good ripe canes on different plantations that varied so much that one part of the plantation produced canes yielding a juice that required double the amount of clarifying substances required by another portion. One of these plantations, particularly, afforded a proof of this assertion, for from each of the four points, north, south, east and west, the cane juice required a different quantity of clarifying agents. This difference was

so marked, and the proportions of lime and sulphurous acid were so constant after being regulated, it was necessary to note the transfer of the knives and hauling from each section of the plantation. Of course, ingredients in the soil caused this great variation alluded to. Herein comes the importance of some practical knowledge of the nature of the soil and cane possessed by the sugar makers.

In speaking of the difficulty in working the cane juice of some of our Louisiana canes, owing to its variability, I will not omit to mention the trouble caused in the clarification of the juice of the tropical cane by its high density and mechanical impurities coming from compound pressure in the extraction. As the juice of the tropical canes of the density of 10 deg. Baume and over has very little uncrystallizable sugar (if any), though inversion by injudicious treatment may produce it, it requires particular attention when heat is applied, either in the clarification or evaporation, which is very rapid, so that the impurities or all foreign substances may be removed before complete evaporation and condensation are effected. This may be known, yet the temperature of the heat applied and other precautionary measures are often overlooked; hence the gray sugars spoken of as coming from tropical countries, and even fermented sugars coming from those regions. Fermentation in juices, sugars and molasses is the bugbear of chemists and sugar makers, and the gnawing, wasting vermin of the sugar planters' vitality.

Elimination of foreign substances from normal juices, including the mechanical impurities coming from compound pressure, can be effected by careful and perfect manipulation of the juice in its clarification, with the best two known substances, "one alkaline" and "one acid, sulphurous acid" (already determined by one of our oldest sugar chemists), properly applied in combination. Perfect evaporation and crystallization are equally important, for the failure of one of these operations in the different stages of sugar manufacture not only impedes the progress of the others but ruins the results.

Perfect work can be done and certain success achieved with the right kind of sugar machinery and improved apparatus that

are regulated or susceptible of being regulated, including the sulphur machine, molasses being included in the best products. With a liberal, progressive planter a correspondence is solicited, with a view of taking off this crop.

T. DAIGLE.

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THE LADY BIRD IN INDIA.

The Madras Mail publishes the annual report of the proceedings of the United Planters' Association of Southern India, in which occur the following paragraphs relative to the introduction of lady birds, the report being read by Mr. H. O. Newport:

The matter of lady birds in connection with coffee scale is not a new one. It has been a well-known fact in Natural History for a long time that certain *Cochinellidoe* (lady birds) do live upon plant, bee and scales. The fact of these having been put to a practical use, however, and propagated to sufficient extent to exterminate the baneful scale is, I may say, comparatively recent. Some months ago, I regret that I cannot refer to the date, an article appeared in the Madras Mail that dealt with the subject, and seeing this and the reference it made to the wonderful success of experiments in this line on the Sandwich Islands, I set to work to gather as much information as I could on the subject. Mr. James Stanes, who was about that time starting on a pleasure trip to that part of the world, made a point of visiting Hawaii and making inquiries about these lady birds. While there he sent me back a lot of valuable information, which I collected and had printed, together with a paper I read on the subject before my District Association, in pamphlet form, and circulated to Honorary Secretaries of all other Associations for general information. While in Hawaii Mr. James Stanes also had endeavored to obtain and have sent out to me some specimens of the two best lady birds, *Rhigobiuss Neutralis* of *Cryptolaemus Montrogevi*; the former for black and the latter for green or soft shelled scale. I have since heard that the editor of Planting Opinion, and I believe other

private gentlemen also, have sent to Australia (from whence the *Cochinellidoe* were first imported into Hawaii by Professor Koebele) and Hawaii for specimens of these lady birds, but I regret to say that those I was expecting have not, up to date, arrived, nor have, so far as I know, any others been received in this country.

In the paper I have written on the subject I have also mentioned the green bug that they have on the Lower Pulneys and which I believe to be a different species from those scales better known in South India, but I need not now say anything more on this subject. While examining the bug on our trees during July, I noticed several varieties of lady birds among the insects and this hovering over the honey dew of the soft-shelled *Pulvinaria* scale, and on further investigation found it upon the scale itself. I noticed four distinct varieties. The first, a lady bird of about 3-10 of an inch long and like all beetles of this class nearly round in shape, with yellow and unequal black marks or spots on its wing cases. The second is black with a yellow head of only 1-10 of an inch in length. The third is again only about 1-10 of an inch long or about the size of a pin's head. It is black with four orange marks—two on each wing case—with a black head, and is not, as the majority of lady birds are, glossy, but is dull and to the naked eye appears clouded over; under a pocket microscope it is found to be covered with hairs. The fourth is the lady bird on the plant before us and is the one which I have, as yet, only been able to pay attention to and really ascertain all about from the laying of its eggs to the emerging of the mature insect from the pupa state. I hope to be able to take up the other lady birds, when I have more time, and go carefully into each variety, but I have good reason to think all of the four varieties I have as yet noticed—I have no doubt there are more—do feed upon the soft-shelled scale or *Pulvinaria*. The lady bird before us is $\frac{1}{4}$ to 3-16 of an inch long. I have found mature insects vary somewhat in this respect. It is of a pretty blue-black, its wing cases being of a uniform glossy color with a head of an orange yellow, making a pretty contrast; the eyes are black, underside orange yellow. The lady birds are quick on their legs if the weather be fine, but in

wet weather are sluggish and slow. Should the weather become cold enough, I have no doubt they would become dormant and remain in this state for some time. It seldom flies and when frightened clings into the stem of the leaf it happens to be on at the time, drawing all its legs under it, bringing the edges of its wing cases close down on the surface of the leaf. While in this attitude it is comparatively difficult to pick off with the fingers, and a thing would be strong enough to resist the peck of any ordinary sized bird. If thoroughly alarmed the lady bird, like many other beetles, as I have no doubt you have noticed, simulates death, and drops from its position to the ground, where, as it generally lies upside down, it is exceedingly difficult to detect. The lady bird like all *Cochinellidoe* has six legs, and its antennae short and clubbed. This is a description enough I think for most to be able to identify the little beetle should they find it on their own coffee. Soon after noticing this black lady bird I found as I thought a fifth variety; a uniform brown or dull orange with a narrow rim of black along the bottom edge of the wing cases and generally slightly larger, but otherwise exactly like the black lady bird. This I have since had reason to think is the male of the species, but I cannot say for certain. During July I caught some of these lady birds and kept them, as you see now, in glass bottles and supplied to them with coffee leaves covered with pulvinaria which they eagerly devoured. If you will examine the lady birds now at work on this scale in the bottles and on the plant, you will see the execution they are doing. If you could examine the scale they leave under a microscope, you will find that most of them have been either punctured and the contents sucked out (in which case the scale turns brown and drops off) or eaten out entirely and only the outer rim of the shell of the scale left. When I first kept these lady birds as you see them now, I very carefully examined all the leaves that I put in for them with a magnifying glass, and also all that I took out of the bottles. The lady birds, I find, spin a fine sort of web on the surface of the leaf. To the naked eye it appears like a small white gloss on part of the leaf, and is hardly noticeable. Whether this is made as a receptacle for the eggs or spun over the eggs I cannot say, but in it will be seen

under a microscope—they are invisible, generally, to the naked eye—three or four small eggs oblong and of a light yellow color.

It is now the part of the Government of India, as the Government of the Sandwich Islands has done, to take up the subject from the point we have brought it to, and engage the services on an expert entomologist such as Professor Koebele, to advise us as to what we should do and how to do it, to propagate the *Cochinellidæ* in sufficient numbers to exterminate the *Pulvinaria*. Also to tell us which of the lady birds will work best upon which of our bugs.

Mr. J. Stanes said: In supporting the resolution, I shall like to give this Association my personal experience in connection with those magic lady birds. It was last August that I first heard of an existing parasite which has done considerable good to coffee by destroying scaly bugs, and I determined to visit the Sandwich or Hawaiian Islands en route to England to inquire for myself how much truth there was in the report. I visited these charming Islands last November, and the Government at Honolulu was very good to me in the matter. The Honorable Mr. Marsden, Agricultural Member, gave me the most complete information, and supplied me with samples of the pests (some of which are identical with our own) and the parasites which had been introduced to destroy them. The cushion cotton scale was the first blight that appeared in the islands and nearly destroyed the fruit culture, and this Government promised the services of Professor Koebele to gather lady birds from distant countries and bring them over to experiment on. In a very short time one species of lady birds was found that devoured this particular blight, and it increased so rapidly that within two years there was hardly a bug left. Quite recently the black and green scale appeared and parasites in the form of different lady birds had in a similar way been found to feed on them and destroy them. I was advised to write to Mr. Marsden, Commissioner of Agriculture to the Government, for two samples of lady birds to cope with our black and green scales. This I did, and Mr. Marsden has promised to send me consignments some time this season. We also sent him samples of the bug, and I am weekly expecting his report on them. Well, gentlemen, I hope the

lady birds will come, but meanwhile, as Mr. Newport has discovered a local parasite which we can now see satisfactorily working on the bug of a coffee plant before us, I would ask this Association to request him to prosecute his studies and researches further, as it is of the utmost importance to us who are afflicted with scaly bug pests.

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BEEET SUGAR AND BOUNTIES.

Mr. Ernest F. Williams, author of the book "Made in Germany," which has attracted such wide attention, contributes a very interesting article on the above subject to the Saturday Review of the 15th August. He says:—

When the Earl of Rosebery takes alarm at the prospects of English commerce in the face of foreign competition, and demands a royal commission to investigate the peril, the ordinary British citizen may well rub his eyes and wonder if Britannia does still in truth rule the waves. For Lord Rosebery is not an alarmist—he never wearies of saying so—but his optimism at last has failed even him, and he has confided to Epsom's young men his fears that, unless we take the precaution in time, Germany is like to serve us in commerce as a quarter of a century since she served France before Sedan. Lord Rosebery is right. The danger is pressing; nay, defeat has already begun to overtake us, and while the supremacy of our big industries is visibly tottering, others less big, but yet important have already capitulated. The worst instance is sugar.

Great Britain was at one time noted for her sugar refining, and up to 1864 the trade flourished. Since then there has been a gradual decline. First the loaf sugar business went; there were about thirty loaf sugar refineries in 1864, and by 1875 (owing to what Sir Louis Mallet aptly described as a "progressive progress of extinction") they had all gone under, overwhelmed by the foreign sugar which was being dumped on the English market. True, one or two courageous refiners made spasmodic efforts to work again in 1876, and subsequently, when the French beetroot crops failed; but no permanent success attended

their struggles, and loaf sugar refining in this country has long since gone the way of the pterodactyl.

Loaf sugar refining has been killed, and now the moist sugar industry lies at the point of death. To go no further back than 1888—though the trade then had been reduced to a wretched condition—we find in that year that 916,759 tons of raw sugar were melted in the United Kingdom. In each year since the amount has been progressively less; last year the total was 768,260 tons. Yet all the time the world's consumption of sugar has been mounting, and the increase is speedily noticeable in the consumption of this country. In 1888 the consumption of foreign refined sugar per head of our population was 20.30lb; in 1868 it was but 2.76lb; in 1894 it was 39.89lb. The 1895 percentage has not yet been worked out; but the total import shows an increase of from 13,944,792 cwt to 14,145,143 cwt. One after another the British refineries are shutting down and the man whose knowledge of the trade only goes back a short way can count numbers of factories which existed a few years ago, and are now either shut or destroyed. In London, in Bristol, in Greenock, in Liverpool, Manchester, Glasgow, Plymouth, and Dublin, the refineries have either been reduced in number or wiped out altogether. Some have been razed to the ground in despair; others, and these are perhaps the most pathetic cases, are still kept in perfect order, hoping against hope for the return of better days, like the woman who keeps ready her home for the return of a husband long since at the bottom of the sea. Take London. A generation ago there were twenty-eight refineries at work; today there are but two. Bristol, again, was at one time famous for its sugar industry; there is not one refinery now at work to echo the departed glory. Sixteen refineries represent the British sugar industry today. When I gathered information on this subject two or three weeks ago the total stood seventeen; but a few days afterward intelligence came of the final shutting down of one of the seventeen, a house which was at one time the largest and most important in a town noted for its refineries. Two went some time since; the third, which fell before the foreigner the other day, was the best equipped of the three, and was furnished with every modern

appliance which could be devised for the successful prosecution of the industry.

It is a woeful tale, and does not end with the British refiner. Our colonial planters have fared well nigh as badly. Estate after estate offered vainly for sale has fallen out of cultivation; growers have been ruined, capital sunk, and labor deprived of employment; and all to make room for the foreigner!

The cause? Beetroot and bounties. The British public has not yet realized that most of its sugar is made from beetroot, as those of you who are managers of schools may easily ascertain by asking your children from what sugar is made; they will, of course, assure you with promptitude that it comes from the sugar cane. Those children learn from text books which date back to the days of other commercial manners. A large and increasing proportion of our sugar comes from countries which know not the cane or the nigger. Germany, France, Holland, Belgium and one or two other countries sent us last year refined sugar to the tune of 14,145,143 cwt, Germany being responsible for between nine and ten millions out of this total; and they do not plant sugar canes round Berlin. Even the sugar which we still refine ourselves is mostly beet; the unrefined beetroot sugar sent us last year reached a total weight of 9,153,956 cwt (nearly 7,000,000 cwt of which came from Germany), against 7,856,041 cwt of unrefined sugar extracted from cane, etc. Why has beet superseded cane? If the pronouncements of our academic economists are to guide us to an answer, we must assign the superiority of beet as the cause, for the best product always commands the market, these gentlemen tell us, with bat-eyed indifference to the conditions of the market. But it is a matter of common and accurate knowledge that beet is not superior to cane, and up till recently it has been inferior, from the producer's point of view, as well as from that of the consumer. For, although a good cane crop will still yield more sugar per acre than a beet crop, the average of the two crops is approximately equal. This has been the result of indefatigable and successful attempts to improve the quality and productivity of the beetroot, and of similar improvements in the processes of refining. And so the inquirer is brought to the core of the matter, and to the question of bounties.

The bounty system has different manifestations in different countries; but as Germany, *more suo*, has now far outdistanced all competitors, take her methods by way of illustration. The origin of the bounty was as follows:—There was a duty in Germany on the manufacture of sugar, and this duty was remitted on sugar destined for export. All beetroots on entering the fabrique were weighed, and paid duty on the weight. Such of the manufactured sugar as was declared for export got a drawback, which the Government fixed, or pretended to fix, at an amount which should correspond with the duty previously paid on the roots. That is to say, the Government calculated that a given quantity of roots should yield a certain percentage of sugar; but the fabricant quickly applied himself to getting a larger proportional quantity of sugar from his beet, and this accounts for the improvements which have taken place in its cultivation and in the manufacture of beet sugar. The result of these improvements was that the fabricant, by devotion to the export business, got very much more from the Government in export rebate than he paid in duty on the roots; that is to say, the Government gave a bounty on the export of sugar, which was none the less real for being veiled. Naturally, beet cultivation and sugar refining in Germany extended themselves with big strides, and between 1869 and 1895 the German beet crop has grown from 208,500 tons to 1,900,000 tons, almost the whole of the refined sugar made from this crop, and by far the largest proportion of the raw, being shot into English ports, which Cobden's beneficent legacy has opened for the purpose. It was a fine stroke of business for German industry, but it was rapidly becoming alarmingly expensive for the German Government, and some alteration in the system appeared inevitable. In July, 1888, Count Hatzfeldt, the German Ambassador to England, assured Lord Salisbury that "the Government of his Imperial Majesty the Emperor have always, as Lord Salisbury is aware, shown their anxiety to assist by all the means in their power, the endeavor of her Britannic Majesty's Government to abolish the sugar bounties." But the anxiety of his Imperial Majesty's Government has been inadequately backed by determination to reform, for in 1892 the previously existing indirect

bounty was altered to a direct bounty, fixed at $7\frac{1}{2}$ per cent. on raw, and 1s on refined sugar. This scale was to operate for three years, after which it was to be reduced to 6d and 9d respectively, and after two years under this scale the bounties were to cease. Reliance on this legislative promise of Germany has doubtless contributed much to the heroic efforts on the part of the British refiners to keep their works going, or in readiness to start again when the artificial aid to foreign rivals, which made competition impossible, should be withdrawn. But the powerlessness of the German Government against the strong sugar interest in the Reichstag has been exhibited in this year's session of the Reichstag. Under the new German sugar law the bounties have been renewed, and the amounts given are double those granted in the law of 1892. The German Government has hedged against loss to its exchequer by raising the duty on sugar manufacture—in other words, the home consumption tax—from 9s to 12s per cwt.

And now what is England going to do? Are we going to watch supinely the complete extinction of the remnant that is left of our old sugar industry? It has been proved clearly that the *debacle* of British sugar is owing to foreign export business. No allegation of lack of enterprise or skill has ever been made against British refiners, nor have they labored under natural disadvantages. On the contrary, there was every reason why they should be successful, as they were successful until foreign bounties choked them. A futile attempt was made some years ago by Sir Robert Giffen to prove that Continental beet would in the course of time have knocked out West Indian cane, even had it been unassisted by bounties, but the attempt failed utterly—one instance will suffice to show how utterly. For eighteen months in 1877-8 the Russian Government made a big temporary increase in its drawback on home made sugar for export. During the twelve months prior to the granting of this increased rebate the export was 496,100 poods; in the first year of its operation the export rose to 3,594,155 poods; in the year after its withdrawal it sank to 50,000 poods.

Once more, what is England going to do? One thing let us be sure of: whatever is done will have to be done by the English

Empire for the English Empire, regardless of foreign countries, and without hope of effective help from them. We have played the international conference farce far too often already; ponderous blue books testify to the inaptitude of that method of defending our own, and we cannot afford to waste more precious time in negotiations of this sort. We must put a countervailing duty on foreign refined sugar entering this country; and, in the interests of our cane-growing colonies, we must have a similar duty on raw beet sugar coming from countries which give a bounty on it. If our most favored nation treaties stand in the way of such countervailing duties, so much the worse for those treaties in their present form. The Continental Governments profess to hate giving the bounties, and we have offered them every assistance in our power to further their abolition. They cannot, therefore, raise any reasonable objection to our protecting our industry from extinction by the only means now left open to us. They would probably never seriously contest the legal quibble that the imposition of countervailing duties violates their most favored nation clauses; and if they did raise the point they could not resist an amendment of those clauses. And in the proposal for a customs union lies the readiest means of introducing the countervailing duty.—Melbourne Age.

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DEVELOP THE AMERICAN SUGAR INDUSTRY.

Editor Louisiana Planter: The consumption per capita in the United States was in—

	Pounds.		Pounds.
1867	24.1	1890	52.8
1871	36.2	1891	66.1
1881	44.2	1895	64.2
1885	51.8		

It will be observed that the increase in the per capita consumption from 1871 to 1891 (twenty years) was 83 per cent. With the same ratio of increase in 1911 the consumption will be 121 pounds per capita. The population of this republic at

that time will be 100,000,000 and with a per capita consumption of 121 pounds the total consumption will be 6,050,000 net tons, which at 3 cents a pound for 96 degree raw sugar f. o. b. vessel at Havre, Bremen or Havana, the total cost will be \$363,000,000. The per capita consumption of sugar in Great Britain has reached 78 pounds, and in Canada, for the year 1895, it was a fraction less than 70 pounds.

Since 1867 we have received from Europe 13,000,000 immigrants who were not as well able to consume sugar as the average American, and since 1864, we have liberated 8,000,000 slaves who were still less able to consume sugar than the average American freeman. These facts account for the low per capita consumption of sugar in this country as compared to Great Britain. We have no slaves to emancipate in the future and our increase from immigration will form a much smaller proportion of our total increase in the future than in the past, therefore we may anticipate the rapid increase in the per capita consumption of sugar.

When we become, as we shall at an early day, large exporters of canned and preserved fruits, jellies, condensed milk and confectionery we shall consume far more sugar than we do at the present time.

It will be observed that the consumption of sugar per capita increased from 52.8 pounds in 1890 to 66.1 pounds in 1891, and in 1895, under the blessed influences of Cleveland revenue reform, which reduced the power of the wage earner to consume sugar, the per capita consumption fell off to 64.2 pounds.

Eighty pounds per capita for our consumption in 1900 is a very conservative estimate. With a population of 100,000,000 our total consumption will be 14,000,000 net tons, which, at 3 cents per pound as above stated, will cost, in gold, \$240,000,000. Shall we buy this sugar and export our gold to pay for it, or shall we produce it at home and retain our gold as a safe and solid basis for an increase in our paper currency whenever our commercial and industrial interests demand it?

The latest returns made to the Department of Agriculture at Washington give the average production of wheat for the United States in 1896 at a little less than twelve bushels per

acre. If the farmer receives for it at the shipping station nearest to his farm 75 cents per bushel, the value of the average yield per acre would be \$9. He cannot buy granulated sugar at the station where he delivers his wheat upon the average for less than 5 cents per pound. It will be seen therefore, that the average acre of wheat pays for 135 pounds of sugar; therefore, to buy one ton of sugar will require the product of a fraction more than fourteen acres of wheat, and to buy 4,000,000 tons of sugar will require the product of 56,000,000 acres of land planted to wheat.

An average acre of land will produce from beets or cane 3,000 pounds of sugar, and, therefore, to produce at home 4,000,000 tons of sugar will require the product of 2,666,666 2-3 acres of land and leave 53,333,333 1-3 acres of land for the production of other crops.

The McKinley policy is to raise this sugar at home, while the Cleveland anti-American, pro-British revenue reform policy is to buy it abroad and pay for it with wheat and other agricultural crops.

In 1892 we produced in the United States 39,739,097 pounds of sugar, and in 1894, 63,763,896 pounds of sugar. It will be observed that the increase in production between 1892 and 1894 under the McKinley sugar policy was nearly 75 per cent. If the same ratio of increase is maintained up to 1902 the total production for that year will exceed 3,000,000 net tons, worth, at \$60 per ton, \$180,000,000, or for fifty years, without any increase in production, \$9,000,000,000.

For the sugar years 1893-1894 our imports of sugar and molasses were of the value of \$128,856,667, and if we add \$20,000,000 for the value of the home product, we have a total of \$148,856,667 as the value of the total consumption of sugar in its raw state.

It will be observed that if in 1911 we consume 121 pounds per capita—not an unreasonable estimate—our total consumption, upon the basis of a population of 100,000,000 will be 6,050,000 net tons. The total production of sugar for the whole world in 1893-1894 was 6,801,000 tons of 2240 pounds each (metrical tons).

We have the land, the climate, the skilled labor and the capital for the production of all the sugar we now or shall hereafter consume.

Shall we produce it at home or remain dependent upon monarchical countries for our sugar supply? Unless we are base cowards, unworthy of the name of American freemen, we will produce it at home. This republic, as the guardian and trustee of government by the people upon the earth, should not be dependent upon any foreign country for any of the necessaries of life which can be successfully produced within the borders of the republic.

The possibilities of our fruit industry are absolutely unlimited with a supply of cheap sugar, and this is also true of our condensed milk industry. Our true policy is to secure to the consumer sugar at the lowest possible price, and encourage its production, just as England encourages the extension of her merchant marine, by a subsidy or a bounty to the American sugar producer.

The sugar refining industry demands and deserves protection just as much as any other American industry. For the past ten years the average price of raw sugar, testing 96 deg., has not been less than $3\frac{1}{2}$ cents per pound. A protective duty of $\frac{1}{2}$ cent per pound is equal to a fraction more than a duty of 14 per cent. upon the cost of raw sugar. It is far less than any other industry so important to the country receives. The protection is so small that a sugar refinery cannot be maintained which does not refine 100,000,000 pounds per year. Our sugar industry should rank with cotton, wheat and corn, as one of the four largest agricultural industries of the nation, and every pound of sugar we consume should be refined within the borders of the republic.

FRANCIS WAYLAND GLEN.

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The road to distinction must be paved with years of self-denial and hard work.

The dryest place in the world is that part of Egypt between the lower falls of the Nile. Rain has never been known to fall there, and the inhabitants do not believe travelers when told that water can fall from the sky.

HAWAII FOR PLEASURE AND PROFIT.

Geographical Situation of the Islands.—First Views and First Impressions.—The Climate and the Soil.—Agriculture and Horticulture.—Injurious Insects and Remedies.—The Voyage.

[By the Editor of the Rural Californian.]

A trip to the Hawaiian Islands is well worth its cost and the time it consumes; but particularly interesting and instructive is it to the plant lover and amateur and professional horticulturist. Abounding in tropical vegetation from the tender fern under foot to the majestic palm trees over head, the first view of the Islands on entering the harbor of Honolulu is one calculated to excite the imagination and fire the heart of every lover of nature. Leaving San Francisco you make the voyage in six days on one of the fine steamers of the Oceanic Steamship Company. Everything about these floating palaces is first-class in every particular, the appointments and furnishings equaling in magnificence the celebrated ocean greyhounds plying the Atlantic Ocean between New York and leading European ports. For the most part, as ocean voyages go, the trip is invariably delightful, as the Pacific Ocean is not so subject to violent storms and the atmospheric disturbances that so often mar the voyages across the Atlantic.

A BIT OF GEOGRAPHY.—The Hawaiian Islands are situated near the middle of the North Pacific Ocean, 21 deg. north of the equator, between the 19th and 23d parallels of north latitude, and extend from the 155th to the 161st deg. of longitude west of Greenwich. They are 2,100 miles from San Francisco, 3,810 miles from Auckland, 4,484 miles from Sydney, 3,440 miles from Yokohama, Japan, and 4,803 miles from Hongkong, China.

The chain or group is made up of eight inhabited islands, upon five of which, viz: Oahu, Hawaii, Maui, Kauai, and Molokai, is the bulk of the population, and where the principal industrial and mercantile enterprises are found. The eight inhabited islands combined have an area of 6,740 square miles, of

which Hawaii, from which the group takes its name, contains 4,210 square miles; Maui, 760; Oahu, 600; Kauai about the same, and Molokai, 270.

Hawaii, the largest of the group, has nearly two-thirds of the total surface, and upon its rugged breast stand the two frowning lavatic upheavals, Mauna Kea and Mauna Loa, respectively 13,085 and 13,710 feet elevation. From the side of the latter burst the fervid fires of the famous Kilauea, where the titanic forces of volcanic activity are still at work. Oahu, the seat of the capital, though third in size, is the most populous, and has an area slightly less than 600 miles. The topography of all the islands is mountainous and the soil volcanic. Gentle trade winds that blow in the same direction nine months in the year, together with frequent rains, insure a deliciously pure atmosphere, free from dust and oppressive heat. Vegetation wears perennial green. Palms, ferns, forests, and tropical jungles; enchanting groves in the embrace of beautiful valleys; banana, pineapple and cocoanut plantations; and plains and mountain sides wearing the rich raiment of tropical verdure—comprise the dreamy poem of this mid-Pacific emerald gem.

FIRST VIEWS AND FIRST IMPRESSIONS.—After a week's "life on the ocean wave" the land lubber is keenly alive to the sight of land, and what a vision meets his gaze as the harbor of Honolulu is approached. Neither the genius of the brush nor the word painting of the poet has been able to catch all of its chameleon-like colorings; but its beauty of land and water, of azure over verdure has called forth some of the best descriptive writing in the language. As a vivid word picture the following from the pen of Joaquin Miller, the poet of the Sierras, is among the best:

"And the morning and the evening were the sixth day.' At dawn of the seventh day out from San Francisco, a low, dark line lifted from the dense blue sea to the left, and soon a huge, black crater hung in the clouds almost over our heads to the right; and so, as the sun burst over the mighty black wall of torn and ragged and serrated lava which looms above Honolulu to the north, we sailed into the loveliest harbor I ever saw. Naples is nothing in comparison. The dense, deep blue of Copra Bay is not nearly so beautiful as is this bay of Honolulu.

The broken lazy little clouds that hung above the wooded town on the hillside were white as cotton; and this, may be, made the intense blue of the bay still more emphatic.

“As we slowly rounded toward the town, we sailed under a rainbow of such indescribable breadth and brilliancy that I hesitate to describe it. This beautiful witness of His covenant had, up to this time, and in all lands, seemed only a narrow half hoop to me. But this Hawaiian rainbow, or may be a succession of rainbows, was so broad that it reached from far out in the bay, not only to the town, but on over the town and up the wooded steeps of the mountains to where the white clouds were torn and pierced by the thousand volcanic crags and peaks on their inaccessible summits. Conceive a rainbow that takes in half the heavens, cotton white, sapphire seas and sapphire skies, the fervid green of banana groves, tamarind, mango, cocoa palms, mantling a town of red brick, and you have some idea of at least the color of Honolulu as I first saw the missionary city.

“The Moslem prophet refused to descend into Damascus, saying that it is permitted man to enter heaven but once; and if I confess that I descended to the wharf, hat in hand, and with a heart bursting with gratitude, do not reproach me. Such boundless good nature. No noise, no friction. Although, as the landing of a steamer is the event of the week, the wharf was packed with people of color, class or nation, yet not one loud or the least uncivil word was heard. It was exactly like Sunday, even like a crowded church service amid the Christmas evergreens.”

CLIMATE AND THE SOIL.—No one consideration enters more largely into a man's calculations, or has greater influence upon his judgment in selecting a home for his family, and a place in which to pursue his business, than climate. The climate of the Islands is all that could be desired, though situated in the tropics. Hon. Wm. R. Castle, ex-president of the Hawaiian legislature writes thusly of the weather:

“Look at your isothermal map of the world, and you will see that the climate of Hawaii averages with the countries far north of it during the summer and south of it during the winter; or,

perhaps it will be better understood to say, that in summer Hawaii moves away from the equator and in winter moves toward it. But perhaps you will say, a climate with a mean average of 75 deg. might have great extremes of heat and cold. Very true, but this is not the case with Hawaii. Here it is rarely as high as 90, never as low as 50. This is in the country bordering the ocean. Go inland, rise to whatever altitude you please up to 14,000 feet, and by and by you will reach a frigid zone. At the great volcano, with an elevation of 4,000 feet, it is sufficiently cool to require a fire at night, and the exertion of climbing or walking by day is a delightful recreation. Comparatively small changes in altitude vary the climate considerably. All the islands are high, and thus each has its delightful range of temperature."

In the general reports of the Hawaiian Experiment Station and Laboratory the general characteristics of Hawaiian soils are discussed and the average of analyses of 45 samples of soil from sugar plantations on the different islands of the group are reported as follows:

COMPOSITION OF HAWAIIAN SOILS.

	Lime. Per cent.	Potash Per cent.	Ph. acid. Per cent.	Nitrogen. Per cent.
Oahu	0.380	0.342	0.207	0.176
Kauai . . . . .	.418	.309	.187	.227
Maui . . . . .	.395	.357	.270	.388

These soils are divided into two classes; (1), makai soils, or those of the lowlands, and (2), mauka soils, or those of the uplands. The variations in the chemical composition and mechanical condition of these classes are shown in the following table:

	Lime. Per cent.	Potash. Per cent.	Ph a id. Per cent.	Nitrogen Per cent.	Fine earth. Per cent.	Course. Per cent.
Makai Soils :						
Virgin	0.460	0.367	...	0.215	89.6	10.4
Cropped ...	.485	.335	...	.237	88.3	11.7
Average ..	.474	.325	0.213	.176	89.1	10.9
Mauka Soils :						
Virgin . . . . .	.415	.324	.248	.530	82.0	18.0
Cropped ...	.240	.278	.243	.451	78.2	21.8
Average ..	.268	.332	.238	.401	80.1	19.9

AGRICULTURE AND HORTICULTURE IN HAWAII.

—Agriculture in the Hawaiian Islands, which in the past has been confined almost exclusively to the raising of sugar and rice, is now being extended to the cultivation of numerous other products, and the large territory unsuited to the culture of rice and sugar is being gradually taken up by homesteaders and utilized in other directions. The cultivation of coffee is assuming large proportions, and the available coffee land will soon be at a premium. The amount of land suitable to this profitable industry is, however, large and under the plans proposed by the government will soon be thrown open to settlers on most advantageous terms.

Many large tracts of fine coffee lands belonging to the government have been leased in former years by private parties and used as cattle runs; but it is certain that these lands will be divided up for settlement as the present leases expire. There are also many other fine coffee lands owned by private parties who do not possess either the capital or the enterprise to develop them. Many of these lands can either be bought or leased for long terms, but, in order to make a bargain, the intended coffee-grower will have to explore the various districts for himself. An effort is being made by the Bureau of Agriculture to obtain a list and description of all coffee lands that can either be bought or leased, and the same will be kept on file for the information of those looking for coffee lands.

In addition to the sugar, rice and coffee lands, says Joseph Marsden, Commissioner of Agriculture, there is a large extent of country where the soil is very rich, but where the rainfall during the summer months is insufficient for the cultivation of the above mentioned staples. The richness of soil on lands of this character has been shown at Makaweli on Kauai, and at Ewa on Oahu, where plantations have been established. The sites of these plantations were formerly dry, barren deserts, where weeds only grow during the winter rains. By the aid of irrigation these lands have produced yields of sugar that have never been equaled on the Islands. But where water is not immediately available, thousands of acres of these lands can be profitably utilized by the cultivation of sisal plant (*Agave Sisalana*), that yields a surer crop than any other plant.

The constant scientific investigation made by the efficient Bureau of Agriculture tends to show that it is a far shorter task to tell what cannot be profitably grown in the Hawaiian Islands than what its wonderfully varied soil and perfect climate will produce.

The *Arum esculentum*, or taro plant, with its broad, lily-like leaves floating on the water, is a part of all Hawaiian landscapes. The kanaka's farming consists in the cultivation of this plant alone; other things may grow if they will, but to the taro nearly all of his labor is devoted. Great skill is displayed in irrigating and preparing the soil. The beds are made of rich, soft mud, each bed being enclosed in a wall of earth impervious to water. The plant is propagated by setting out the tops of the ripe root; water is then let in upon them, and retained until the planting of the next crop. It is said that forty square feet of taro will supply food for an ordinary family for a year. The root can be eaten in many ways; boiled, baked, or fried is equally good, and the young leaves when boiled make a very good substitute for spinach. It is said, with much truth, that every one, particularly the natives, who eat the taro (*poi*) are never troubled with indigestion. In fact, many have been completely cured of this ugly disease by the use of the taro flour.

Orange culture affords a good opening, as this fruit will thrive in almost any part of the group. But, like coffee, it takes several years to reach the bearing period, and can only be engaged in by those having ample means. Oranges are, however, quite profitable for supplying the local market, for which the present supply is inadequate. No finer fruit is grown in any country than the Sandwich Island oranges, which are generally sweet, juicy, and extremely healthy when allowed to ripen on the tree.

Grains, such as wheat, oats, barley, etc., as well as corn, can be grown on the uplands, but not to such perfection or profit as in other countries, and for this reason their cultivation is not much attended to.

For minor tropical fruits, Hawaii can hold its own against the world. The opening for pineapples, for instance, surpasses Bermuda, as pines of the smooth skin, cayenne variety, weigh-

ing ten pounds, are not uncommon here, and they are a sure and paying crop and always in demand.

All the tropical fruits grow here abundantly,—among them bananas, oranges, avocado pears, peaches, tamarinds, limes, lemons, citrons, pineapples, guavas, strawberries, raspberries, ohelo berries, grapes, mountain apples, plums, etc.

No country so accessible to the Pacific Coast offers better advantages in soils and climates, transportation and other commercial facilities for the business of growing plants of a tropical character for the markets of the United States. The palms luxuriate in the open air, and magnificent specimens of both the feathered and fan leaved varieties are features of the landscape in all directions; ferns in endless confusion and variety are to be met with on all sides; choice ornamental shrubs and herbaceous perennials are very common; in fact, there is scarcely a plant of economic or ornamental value that cannot be grown cheaply and in immense quantities in the open air. These conditions certainly invite the attention of brain, brawn and bank to the fact that the production and exportation of plants of a tropical nature to supply the markets of the United States is an industry that offers every inducement to capital and labor on the Islands.

While on the subject of Hawaiian exotic and indigenous vegetation we wish to acknowledge the receipt, on the part of the Hawaiian government through its Bureau of Agriculture, of a magnificent collection of upwards of two hundred choice plants, including nearly all the different genera and species growing on the Islands. This fine assortment embraces specimens of palms in variety, ferns in variety, shrubs and trees (both economic and ornamental), in variety, besides creeping and climbing plants, succulents, etc. The collection was presented to Mr. C. M. Heintz personally, as a donation to the public parks of Los Angeles. For the most part these plants have been placed in Elysian park.

At a meeting of the Park Commissioners held November 12 the thanks of the Board were extended to Mr. Heintz, and due acknowledgments made to the Hawaiian government for its courtesy in the matter. The secretary of the Board of Park

Commissioners was instructed to convey copies of the resolutions to the Hon. Joseph Marsden, Secretary of Agriculture, Honolulu, and also to Mr. Heintz. The collection contains plants new to these parts, and their progress under California conditions will be watched with interest.

Nearly all kinds of garden vegetables are also raised here, such as potatoes, beets, carrots, onions, peas, beans, corn, melons, cabbage, cauliflower, squashes and tomatoes. Their cultivation is chiefly carried on by the Chinese, who are very expert in this line.

Flowers grow in great profusion and abundance, such as roses, dahlias, carnations, chrysanthemums, violets, pansies, tulips and other bulbs, with almost every species of flowering vines.

INJURIOUS INSECTS AND REMEDIES.—The introduction of the hydrocyanic acid gas remedy against the injurious insects in the Hawaiian Islands, and indeed in all tropical countries, marks an epoch in intensive horticulture and agriculture. Wherever tropical fruits and vegetation abound there will it find its greatest utility. The reasons are obvious. All tropical vegetation is more or less persistent—that is evergreen—and hence other remedies are of no avail for the simple reason that they do not reach all parts of the plant or tree when applied. In a corresponding ratio as economic and ornamental plants thrive and flourish in the tropics so also do the injurious insects and diseases to which they are subject find a congenial environment. Hence the successful horticulturist in the tropics has quite as much to contend with as his co-laborer in colder climates. To the growers of the Hawaiian Islands who are just entering upon a period of intensive fruit culture a word regarding the hydrocyanic acid gas remedy and its uses and efficiency will be of interest and importance.

By its use all ornamental and economic nursery plants leaving the Islands for the United States markets could be shipped in an absolutely clean and healthy condition, thus passing quarantine at San Francisco, thereby avoiding delays and expense, and often confiscation. The demand for greenhouse plants and the more hardy sorts which can be grown at nominal cost on the Islands would thereby be greatly enhanced. This branch

of the seed and nursery business has been sadly handicapped by reason of the prevalence of injurious insects infecting many different kinds of plants grown on the Islands and which find a market in the U. S. by way of San Francisco.

This branch of the seed and plant trade is still in its infancy and is capable of great expansion. No one thing is so well calculated to stimulate and increase its commercial importance as the introduction of the hydrocyanic acid gas remedy, which insures the arrival of all plants and nursery stock produced on the Islands submitted to its treatment coming into the United States in a clean and healthy condition.

But its importance to the planters of the Islands extends beyond this consideration. The growers of citrus and deciduous fruits, the owners of coffee and banana plantations, the owners of all kinds of orchard and vineyard properties will find the application of hydrocyanic acid gas fumigation effective against all obnoxious insect life—a remedy that will accomplish for the growers of the Islands what it has done for Southern California, viz: rescued the fruit industry from the abyss of destruction and again placed it upon a paying basis. This simply means an increase all along the line in the exportation of economic and ornamental plants from the Islands to the United States.

While on the subject of injurious insects it is pleasant to note that Mr. Albert Koebele is still in the employment of the Hawaiian government, and is doing a good work for the planters and fruit growers in his investigations in applied entomology. His varied experiences and extensive travels have broadened his vision and in every way strengthened him as an authority in entomological matters. It is fortunate that he has so able and sympathetic a chief as the Hon. Joseph Marsden, Secretary of Agriculture to the Hawaiian government. Both are doing a splendid work for the advancement of intensive culture, and the final outcome can only be the broadest development of the great agricultural wealth that lies dormant in a rich soil kissed by a tropical sun and bathed in summer rains and the balmy trade winds from southern seas. The Department of Agriculture has practically adopted the hydrocyanic acid gas remedy, and in the future all plants coming to the United States will be

fumigated before being placed on board ship, and a regular certificate issued under authority testifying to this fact, and guaranteeing their freedom from insect pests. If these regulations are faithfully carried out there is no reason why the export seed and plant trade cannot be doubled and trebled within a year.

HOW TO GET TO HAWAII.—The Hawaiian Islands are only six days from San Francisco and eleven days from New York. The fine steamers of the Oceanic Steamship Company of San Francisco sail twice a month to and from Honolulu. The steamship *Australia* of this line sails to and from Honolulu only, making the round trip in twenty-four and twenty-five days, sailing on alternate Tuesdays and Fridays. The through Australian line, comprising three steamers, the *Alameda*, *Mariposa* and *Monowai*, touches Honolulu outward and homeward, and through passengers to the Colonies frequently avail themselves of the privilege of stop-over at the Islands.

The single fare to Honolulu is \$75, or \$125 for the round trip; round trip to the Volcano from San Francisco and return via Honolulu, including all hotel accommodations and other necessary expenses, \$225.

In the way of hotel accommodations the Islands are singularly fortunate. The Royal Hawaiian Hotel is one of the leading architectural structures of Honolulu. The grounds upon which it stands comprise an entire square of about four acres, fronting on Hotel street. This large area affords ample room for a lawn and beautiful walks, which are laid out most artistically with flowering plants and tropical trees. There are 12 pretty cottages within this charming enclosure, all under the hotel management. The hotel and cottages afford accommodations for two hundred guests.—Rural Californian.

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Lord Roberts says that if the British soldiers could be so trained as to make it certain that one shot in twenty would reach its billet, our army might be pronounced five times as formidable as any Continental army had yet show itself.

JAMAICA A PROSPEROUS COLONY.

The address delivered by Governor Blake at the opening of the session of the Legislative Council of Jamaica must be pleasant reading to every true-hearted West Indian even should he be one directly connected with a colony, like our own, in which, having reached commercial low-water, the tide of hoped-for prosperity is only on the turn. As an example of what a manly vigorous policy of self-help can do to better the domestic conditions of a people, with a strong man as leader, having the confidence of those whose interests are the main object of his service. Jamaica offers much in the way of guidance and suggestion. It seems only like yesterday that its financial condition was as rickety as its enemies could desire, its main industry the sugar trade, in a state of bankruptcy, and nothing else in the agricultural line of any consequence to take its place, the minor industries of the island being of hardly greater importance as compared with sugar than the minor industries of our own colony are at the present day. Now, the whole face of the country has changed. The sugar industry, in a diminished state, is still to the fore, but an immense export fruit trade with the States is now giving lucrative employment to large sections of the laboring people, and adding visibly to the wealth and strength of the island. Instead of having reluctantly to reveal a left-handed balance to the legislators in session the Governor was able to proclaim at once, as with a flourish of trumpets, that the colony was in a satisfactory condition; the volume of trade increased both as regards imports and exports; and the outlook for the immediate future, full of promise. The past year had "demonstrated the safety of the policy of multiplying our products as far as possible." In addition to the banana trade a new departure had been made in the exportation of fruit. The orange groves of Florida, which it was hoped would supply the North with all the juicy members of the citron family, had been practically destroyed by insects and frost, and the Jamaica fruit-growers seized their opportunity to fill the vacancy which the closing of the Florida supply had created, the result being that the value of the exports of oranges, limes, shaddocks, and grape fruit rose from £14,142 in 1894 to £160,630 in 1895.

Here is something for the Demerara mudheads to think over. The orange tree grows excellently well in this colony, and it is a fruit that can stand a sea journey of ten or twelve or more days without detriment to its quality, it offers a promising article upon which to found an export trade in fruit. It might be said that our orange trees require attention, and we are quite certain they do, as do all our fruit trees, there being no orchard throughout the colony so far as we are aware; but, Governor Blake says, alluding to the export returns of 1895:—"Remembering that this large return has been received from the product of trees hitherto practically uncultivated, and that the soil and climate are peculiarly well-suited to the growth of these fruits, we may look forward to the rapid extension of this industry, the development of which the Government is prepared to encourage by every means in its power." As one way of developing the industry, and a very excellent way, and one the adoption of which we have advocated for years past in connection with our own people, the Governor of Jamaica says he has arranged with the Board of Education that the elementary principles of agriculture and horticulture shall be taught in all the schools, and he is now considering the question of offering special inducements to teachers to secure attention to the subjects. We hope one day, before we have to give up newspaper editing, to have the pleasure of publishing a similar announcement from the Governor of British Guiana. But the rapid development of the Jamaica fruit trade which has proved such a valuable assistance to the colony, would not have been possible, at all events to the same extent, if the Government had not had the courage to venture upon a comprehensive plan of communication between the rural districts and the centers of trade and shipping. And it is in this direction that posterity will be directed to look for the permanent mark of Governor Blake's administration. To quote from his address:—

"The past six years may be said to have been devoted mainly to the improvement of the old and the creation of new means of communication, without which there can be but little profitable expansion of capital or labor. In this respect Jamaica is now as well equipped as any island of her size in the world.

Every district of the island is traversed by good driving roads. All the rivers are bridged and the completion of the Port Antonio branch of the railway extensions is expected at an early date this year. The extension to Montego Bay, completed in 1895, has developed considerable traffic, and the receipts of the railway during the year, which show an increase of 27 per cent. upon the result of last year's operations, will be sufficient to pay the interest upon the issued first mortgage bonds and leave a small balance towards the payment of interest upon the second mortgage bonds, held by the Government. We have a lesson to learn from this also; for until our means of communication have been improved, even the industriously-disposed of our peasantry will have no inducement to grow fruit for the market. In connection with agriculture, we read that one model farm has been established in the parish of Clarendon and arrangements have been made for the establishment of similar farms in other localities. These farms are under the supervision of the Jamaica Agricultural Society, and with a view to strengthening its hands, the Governor says he will propose an increased grant to it next year. As we remarked at the outset, it is very gratifying to read the new lease of life which Jamaica, the gem of the British West Indies, has taken. The island may yet resume much of her own importance as one of the richest of the Mother Country's colonial possessions. Submitting the result of the new regime to the metallic test, we find the fullest justification for the victorious note upon which the Governor's address is sustained. The colony starts its financial year with a balance of £74,000 to the good, the surplus of revenue over expenditure in 1895; and this amount added to an estimated revenue of £646,000 will meet an estimated expenditure of £670,000 and leave about £50,000 for unforeseen contingencies. This is indeed very satisfactory, and we heartily wish that all the other West Indian colonies were in a similarly fortunate position. The surest way to attain to a similar degree of prosperity, is to adopt and carry out a similar policy of agriculture development.—Argosy.

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The small steel screws used in watchmaking are worth six times their weight in gold.

OUTLOOK FOR COFFEE.

The visible supply of the world is about 375,000 bags more than at the same date last year. The visible supply for the United States is about 42,000 bags less than at the same date last year. Stocks in Europe are about 89,000 bags less than last year. Stocks of mild coffees in the United States are only 91,000 bags, being 16,000 bags less than at the same date last year. The above shows that the increase has been entirely in the stocks in Brazil and in the afloats from Brazil for Europe. The outlook for 1896-97 is outlined by Baker & Young, coffee importers, as follows:

The price of No. 7 Rio coffee today is 10 $\frac{5}{8}$ for cargo lots, as against 16 $\frac{1}{8}$ for the same date last year. Thus we have discounted the present large crop to the extent of \$7 per bag in prices, and this appears to us to be rather an over than an under discounting, as there is no pressure of actual coffee, either in the United States or Europe. The large and continued purchases in Brazil for European account is evidence that this view is taken there.

It is our experience, running back for over twenty-five years, that it is the large crops which bring the high prices and the small crops that bring the low prices, on account of the tendency to discount the future from six to twelve months ahead, and carrying out this view, the price on the present crop depends on the anticipation of the next crop. If reports of the flowering, now about to take place in Brazil, are favorable to a large crop, we shall see still lower prices. If these reports should be unfavorable, we must look for an upward whirl in coffee. We must have a large crop to keep prices to their present low level. A medium crop would force them up rapidly. An enormous crop like the present would depress them. What then are the present prospects?

In July we had reports of frost in Santos. For the last month we have had continued reports of drought, in Rio especially. Many responsible houses declare that the prospects have been much hurt by both of these causes; some others say that the damage has not been so serious. All agree that the flowering is very late, and the latest reports are that the drouth has been broken, so that we may now expect a flowering in October.

There was no flowering in September. Taking everything into consideration the present outlook is not as favorable for a large crop as it was at this time last year.

With only one exception in twenty-five years a small crop has followed a large one, owing, we think, to the fact that the trees get exhausted by the copious bearing, and have not vitality enough to produce two large yields in succession. Precedent says that we should next year have either a small, or at best, a medium crop, and on this supposition prices are certainly low enough if not too low.—Am. Grocer.

—:o:—

BUSINESS COMPETITION.

O wad some power the giftie gie us,
To see ourselves as others see us!
It wad from monie a blunder free us,
And foolish notion. —Burns.

Let the trade take a look at itself through the glasses of the New York Sun, conceded to be the ablest edited journal in this city, and which says of business competition:

“The rivalry of the great business establishments of the city in these times must be advantageous to buyers, not only to those who make their purchases at these establishments, but also to those who make them anywhere else. The competition is sharper and upon a larger scale than we have ever known it to be before, but, in so far as we are aware, it is fair and amiable. It has brought a great deal of trade to the city. It has stimulated thousands of people to buy who would not otherwise have bought. It has led the competitors to strive to outstrip each other in improving the quality of their goods. It has made it more difficult than ever to dispose of inferior wares, or to make prices higher than they ought to be. It has opened up new opportunities for enterprise and push, and business genius. It is good for shopmen. It is good for factories of all kinds, and for workmen in every branch of industry. It helps inventors. It must help those people of talent who possess novel ideas of a merchantable kind. It is a great thing for bright young men and also for bright young women.

“We suppose that the profits upon sales in some lines of

business have been reduced by the keenness and magnitude of the competition that now exists; but one may be sure that the able men who conduct the establishments of which we are speaking know very well what they are about. A reduction of profits with an increase of sales may be perfectly satisfactory to the seller and may enlarge his returns. The successful business men of New York understand the long and short of their business. They are men of discernment and are practical in their ways. The long-headed New Yorkers among them do not lie awake all night because energetic competitors come here from Chicago, Philadelphia or other places. Let the merry competition go on. Everybody has a right to join in it.

"We guess that the keepers of the smaller places of business have ceased to complain of the establishments which are called 'big department stores.' What is the use of complaining? The big stores can't be put down. They can't be prevented from advertising their goods, prices and bargains, or from telling of their attractive novelties. Besides, there is plenty of room for the smaller dealers, thousands upon thousands of them. Lots of them make money, and some of them grow rich in their business. They get their share of the trade of their locality, and that is as much as many of them care for."

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A plan is about to be submitted to the British Parliament for supplying London with sea-water at the rate of 11,000,000 gallons a day. The water is to be pumped from the sea into a lofty reservoir at Lancing, on the coast of Sussex, whence it will flow down hill through pipe to Epsom and from Epsom will be distributed over London. It is to be used principally for baths, for watering the streets, and for flushing the sewers. The object is to promote the healthfulness of the great city.

The fire department of Berlin has a fire engine, the carriage of which is constructed entirely out of papier mache. All the different parts, the body, wheels, pole, &c., are finished in the best possible manner. While the durability and powers of resistance possessed by this material are fully as great as those of wood, the weight is, of course, much less. The lightness of a fire engine is, of course, a great advantage, and it seems not unlikely that wooden carriages will in a short time pass out of use altogether.