LATEST telegraphic advices from New York to June 9, quote Cuban centrifugals of 96 deg. test at 3 13-16 cents,—a decline of seven-sixteenths from the quotation given last month, which was 4 1/4 cents. This decline, it is said, has been caused by the overtrading of speculators in London, who have been forced to sell their sugars.

INTENSE cultivation means: Manuring, deep plowing, drainage, rotation of crops. It means keeping the land clean, free from weeds and stones. In a word, intense cultivation means hard work; but it also means abundance of returns for those who labor.

THE Havana correspondent of the Louisiana Planter gave, in a recent letter, a statement, according to which the losses sustained by Cuba, on account of the insurrection, amounted to $150,000,000. To this amount he adds the increase of the Cuban debt from March 31, 1895, to March 31, 1896, amounting to $155,000,075, which aggregates $305,000,075, and to this is added the previous debt of Cuba, $163,551,850, making a grand total of $468,582,025.
There is no article of greater importance to the grocer in building up a trade than coffee. If he handles thoroughly good coffee, taking care to keep his stock of uniform quality, he will soon gain a reputation for reliability, and cannot fail to succeed in holding and increasing his business in coffee and many other lines. Pure Kona coffee will be sure to do this. It is among the best grown, and is not surpassed even by Mocha or Pedang.

A hasty to get rich is the ruin of many a bright and energetic business man. He is not willing to wait for fortune to come to him, but must press madly forward in pursuit of the fickle goddess over ways that are rocky and up heights which are often inaccessible to him. After a meteoric career he frequently finds that the old man who has kept on sawing wood is far ahead of him in the way of success. "Patient and persistent plodding wins the race."—Exchange.

Motor Carriages.—United States Consul-General Carroll at Dresden gives illustrations of the new system of propelling street-cars by gas-engines. These engines are of nine horsepower, and are placed under the seats. A speed of nine miles an hour can be obtained with a car carrying thirty-six passengers, the cost being 15 cents a mile with gas at $1 a thousand feet. The Consul-General says that the system is attracting wide attention, and many German cities are adopting it, as it is cheaper of operation than the trolley, and requires no overhead charged wires.

The Louisiana Sugar Bounty Claims.—Advices from Washington state that the Supreme Court of the United States has sustained the validity of the appropriations made by Congress to carry out the sugar bounty clauses of the McKinley and Wilson tariff acts by a unanimous opinion, affirming the decision of the circuit court of the eastern district of Louisiana, and reversing the action of Comptroller of the Treasury Bowler, who refused to permit the payment of the bounties on the ground that the act was unconstitutional. The court in its opinion said that for the purpose of the case it was unnecessary to decide whether such legisla-
tion is beyond the power of congress, but that in either case the appropriation of money in the act of 1895 to manufacturers and producers of sugar who had complied with the act of 1890, was within the power of congress to make, and was constitutional and valid. The opinion of the court was delivered by Justice Peckham. There were test cases.

A very simple automatic method for cleaning the tubes of a triple effect has been suggested. It consists in placing in each tube of the apparatus small hollow balls; these have a free motion and keep the minor tubes in a perfect condition, under which circumstances the triple effect does not need cleaning until end of the campaign. It must not be forgotten that, under existing methods, at least six hours are lost in scraping the tubes of each compartment. If these operations are neglected, the efficiency of appliances is lessened; hence, if the difficulty may be obviated by the foregoing proposed method, it is worth adopting.—Sugar Beet.

Countervailing Duty on Sugar.—In the U. S. Senate, in may, the bill to protect commerce, which was introduced by Mr. Perkins (Rep., Cal.,) and which was then referred to the Committee on Commerce, was reported back from that committee by Senator Caffery, with a motion, which was agreed to, that it be referred to the Finance Committee. Mr. Caffery explained and advocated the bill, which provides for the imposition of increased duties on foreign products on which bounty or premium is given by the Government of the country from which they come. The whole sugar industry, Mr. Caffery said, was threatened with destruction by the proposed increase of bounty on sugar by the German Reichstag. The sugar industry of the United States was already laboring under a great many burdens, and he thought it meet and proper that Congress should not permit such a great industry to be destroyed by the discriminating action of a foreign country. That same discriminating action had already driven all cane sugar out of Continental Europe, and it would destroy in the United States an industry from which half the population of his State gained their sustenance.—Sugar Planters' Journal.
Publications Received.—We acknowledge the receipt of the following recent issues: From the United States Department of Agriculture, Washington: “The Honey Bee, a Manual of Instruction in Agriculture.” This is a comprehensive handbook on the care of bees, giving full information regarding them, with seventy-six beautiful illustrations. The author is Frank Benton.

—Also, from the same, several pamphlets relative to the “San Jose Scale,” with a full account of its history, etc., “The hop plant louse;” “canker worms;” “cabbage bug;” “rose chafer;” “cotton boll worm;” “elm leaf, beetles;” “the buffalo moth;” and the “army worm.”

—From the American Protective League, New York, we have received No. 9 of “The Defender,” a volume of 365 pages, devoted to the “Protection of American Industries.” It contains a mass of statistics and information, bearing on the above subject.

—From the Agricultural Bureau of the University of California, pamphlets on “The Study of Human Foods,” and on the “Distribution of Seeds and Plants.”

—From the Editor of the American Journal of Science, a leaflet regarding the “Propagation of the Sugar Cane,” which will appear in our July issue.

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A TRIP TO HILO AND OLAAN.

The approach to Hilo is among the most picturesque to be found in any part of the world. Leaving the rocky, uninviting and barren coast of Mahukona in the steamer Kinau, and passing Upolu, the north point of Hawaii, a scene of unrivaled beauty opens to view. The landscape changes in appearance from sterile plains and bare hills to bright green fields of pasture and cane, interspersed with groves of shade and forest trees that extend far back till lost among the clouds that float over the highlands. Suddenly open to view numberless ravines and deep cut valleys, their sides clothed with the densest foliage, while through this wonderful scenery, rush streams, leaping in foaming cascades and waterfalls, in ever varying beauty. Add to this indescribable display of nature, the pretty villages springing up around the sugar
plantations, the roads lined with shade trees, the tall smoking chimneys of the sugar factories, the locomotives with their long trains of loaded cane cars, and the various shutes and wire cables for sending freight from the high bluffs to vessels at anchor near the shore,—and the traveler has a panoramic scene that extends a distance of nearly eighty miles with six hours of daylight, for observing it, that can be duplicated nowhere in this ocean, if indeed on this globe. It is impossible to present to a stranger an adequate conception of the wonderful beauty and variety of scenery on this Hamakua coast of Hawaii. Fortunately the Kinak steams along it both on the outward and return trips during the day time, thus affording travelers the best opportunity to see it in all its grandeur and beauty, and no tourist should fail to improve it.

One night out, and thirty hours from Honolulu, the Kinak drops her anchor in the spacious bay of Hilo, where travelers are landed, as at other island ports, in boats at a rude and at times dangerous wharf. What Honolulu was forty years ago, Hilo is now—just making ready to put on the garb of a commercial port and city. To assist its development, it has needed more than anything else, what the Legislature has just voted for it—a new wharf, near Coconut Island. The sum that has been appropriated for this object is none too large, for the Government's income from the wharf will be more than double the interest that will be paid on the money borrowed to construct it. It will surely prove, as some other national works have, a profitable investment.

The village of Hilo is growing rapidly, as is shown by the number of buildings recently erected, and the projected improvements. The roads leading to the outer districts are undergoing changes for the better, and if this work is continued on the plan now adopted, of macadamizing the highway and reducing the former steep grades to more level ones, it will not be many years before this district will possess as good roads as any on these islands. The work is under the supervision of a competent engineer, Mr. Wm. Bruner, who has shown himself well qualified for it. Attention is paid not only to the grade, but to the drainage and bridges, in a district which is subject to frequent heavy rains and freshets. If the work is pushed on as at present, the most difficult sec-
tion of Hawaii will be provided with well built macadam roads, from the volcano to Laupahoehoe, before the year 1898. The windward side of Hawaii, from Kohala to Olaa, is capable of producing annually crops of sugar, coffee and fruits to the value of several millions of dollars; but to secure this, roads are an absolute necessity, in order that the crops may be readily and cheaply moved to the ports of shipment. This road work is not being done wholly by Government. One plantation has constructed during the past two years over eight miles of macadam road on the estate, and the manager, Mr. Scott, assured the writer that it was among the best investments made by the plantation, in a labor-saving point of view.

Among the undeveloped resources of Hawaii is the banana business. There are thousands of acres in the Puna and Olaa districts, and also back of Hilo, where a million bunches of this fruit can be cultivated and harvested annually. As we ride through these districts wild banana trees may be seen on every hand, some of enormous growth—thirty feet in height. These wild plants, however, do not furnish the kind of fruit wanted for export. If the Jamaica and Central American fruits are any better suited to the popular taste in the United States than the Chinese variety now growing here, they can be readily introduced and cultivated. One thing is certain—that the use of this fruit is increasing not only in America, but also in England and Europe. The imports of bananas into the United States during 1895, exceeded 17,000,000 bunches, and of this total only 98,164 bunches came from these islands!—Whereas, we might readily export one million. This consumption may appear to be large, but for a population of seventy millions, which is accustomed to fruit as part of its every day food, it is a small yearly supply.

What an opening for a Portuguese or Chinese colony, located back of Hilo, to engage in a branch of business that will not merely give a good support for thousands, but that would make many families independent within a single decade. If the former people do not improve the opportunity, the Chinese or Japanese surely will do so. This Hawaiian banana trade will take a start before many years, and a line of steamers will be engaged in the exclusive ser-
vice of conveying fruits from Hilo to American and Canadian ports, as lines of steamers now carry bananas from Cuba, Jamaica and Central America to ports in the United States and England. Not less than thirty large steamers are now engaged exclusively in this trade in the Atlantic, and it is rapidly increasing.

A marked improvement is noticed in the Hilo dwellings, particularly those erected during the past few years. Yet the same narrow and rough streets still exist in the town, with the exception of the fine beach road to Waiakea, which has been constructed during the past two or three years. It can readily be extended along the shore to the east and southward, for several miles. The land along the bay has increased in extent, by accumulations from the sea, so that the water front has extended out in places two or three hundred feet beyond what it was twenty-five or thirty years ago. All this new land, makai of the road should be reserved for a plaza, extending from Waianuenue street to the Waiakea stream, a distance of fully one mile. It would become one of the great attractions and resorts of the future city on the bay. On portions of this newly made land, buildings have lately been erected by squatters; but this should be forbidden, as no land formed by the sea, makai of a public road, can be claimed by any parties but the town, city or state authorities.

The Olaa district is being settled quietly but rapidly, by intelligent and well-to-do-foreigners, some of whom have brought their families. They have been attracted hither by a strong desire to dwell in a tropical climate, and engage in what is generally regarded as a pleasant, healthy and profitable industry. Pioneer life on Hawaii, however, as in every other land, requires hard work, with patient perseverance backed, if possible, with sufficient capital to provide the ways and means for several years, till the first crops begin to furnish returns, which may be four or five years. A good macadam road from Hilo to the Volcano supplies the first necessity of settlers in a new country, and renders the locality a very attractive one to those who contrast it with roadless districts in this and other countries. Every family which we met seemed contented and well pleased with their present and future prospect.
Olaa possesses some of the best soil on these islands—volcanic aa, or a debris of soft rock, decomposed by frequent rains, and enriched with the decaying foliage and trunks of trees—a process that may have been going on for centuries, producing a soil of wonderful richness. It seems strange that such a choice section of land should have remained unoccupied, and its good qualities almost unknown for the past fifty or one hundred years, locked up under a crown land system, that rendered it practically a forbidden field. It may have been occupied in pre-historic times, but if so, no signs of occupancy remain to be found to-day. Even now, the actual area of valuable land for fruit trees, in Olaa, Waiakea and adjoining districts, including Puna, is unknown. One thing is certain, there is land enough there, if properly cultivated, to sustain a population of many thousands, and to maintain a fleet of fast steamships in constant employ, carrying coffee, sugar, bananas and other products, direct from Hilo to American ports.

There can be no prettier sight than that of a well-planted and cleanly-cultivated coffee plantation, of from twenty to one hundred acres, with its symmetrical glossy-leaved trees standing in rows of seven or eight feet apart, and a thousand feet in length, as straight as a surveyor’s line can make them, so that, looking in either direction, to the right, the left, or diagonally, every row is perfect, without a plant missing, or a weed to be seen. Then to see this field in full bloom, the white blossoms giving the orchard the appearance of having had a light snow-fall from Mauna Kea’s white peaks. Or still later, when the limbs of these beautiful trees bend almost to the ground, laden with berries in all stages of growth from dark green to the handsome cherry-red, ripe for the harvest. It is one of the prettiest field pictures, that can be found.

Most of the coffee plantations in this district are in their infancy stage—in the rough—but two of the older estates that we visited, those of Mr. A. Zimmerman and Mr. J. Reinhardt, which are now in full bloom, afford some idea of what this district is destined to become in a few years—a garden of perpetual beauty. A wholesome rivalry will lead each to make his a pattern for others. Much hard pioneer work is
being done, and it takes time and labor to clear off the primitive forest, and bring the land and soil into condition for the choice trees which are to take their places. In such a cloudy, rainy district as Olaa, shade trees are not needed, and the best plan is unquestionably to remove them all before planting. There are windy and hot districts, however, where forest trees may better be left standing, and where their shelter is a benefit.

Olaa is not the only place where coffee is being planted on Hawaii. New groves are springing up back of Hilo, through the whole district to Laupahoehoe, and thence on through Hamakua, Kohala, Kona and Kau, not forgetting Puna, which Mr. Rycroft claims will soon be covered with immense coffee plantations, surpassing even those of Kaffa-land. Certain it is that the cultivation of the berry is rapidly extending, and it is estimated that not less than ten thousand acres are already planted, on Hawaii alone, with an acreage, of 100,000 in the not remote future. The fact that people are now assured that the blight is a thing of the past, imparts great confidence to those who have been anxious to engage in it, and who, having the land and the means, will push on the work, with all the energy they can bring into it. Trees well planted and well cared for, ought to produce on an average six hundred pounds to the acre, while some of the improved varieties, such as Liberian or Guatemala, may exceed 1000 or 1200 pounds: It is well, however, not to be too sanguine.

H. M. W.

HAMAKUA NOTES FROM OUR CORRESPONDENT.

Hamakua is again to the front as a first class sugar producing district, and there are indications that the present crop will exceed all previous records, with a total of over 30,000 tons. The improvements made in many of the mills last season are giving great satisfaction, and will help to increase the yield considerably.

One of the latest machines erected here, is the "Baldwin weigher," which has just been set up at the Hamakua mill. It is evidently one of the best inventions in use for weighing or measuring juice. It was thoroughly tested before being
put to use, and out of twenty-five tests there was hardly any difference in the weight. It is a most ingenuous machine, and not only weighs, registers and takes sample, but it does its work absolutely correct.

Among the highest extractions secured, so far, by any of the seven roller mills of this district is 8 per cent. This was at the Hamakua mill; but the average extraction, is much below this figure.

Several mills are after the sugar, lost by entrainment, and they have been quite successful in stopping it, to a great extent, if not entirely.

The rose-bamboo variety of cane continues to give satisfaction here. It gives a fine stand of cane, and satisfactory yields of sugar.

Most of the planters are now subsoiling, green soiling, and fertilizing quite extensively, and with good results.

A number of improvements are to be made at the Kukaiau mill this year, and among them a vacuum pan, a new cell for the double effect, that will increase it to a triple effect; also one engine, and three centrifugal machines, one clarifier and precipitator, and thirty coolers. With these improvements the mill will be in a condition to run night and day, and be able to do the work at the most profitable time of the season for doing it.

A number of the new cane slicing or cutting machines are in use here now, and several more are ordered. I may add that those who have used them, speak highly of them, and are well pleased with their work. Their cost is only a few hundred dollars each.

The juice is standing very high at the present time all through, the district and it is in prime condition, giving no trouble whatever in the boiling. The sugar content has also increased nearly four degrees, or twenty per cent., and shows the great advantage of harvesting when the cane is ripe.

Coffee is doing splendidly here, and it is stated that Mr. J. M. Horner's coffee trees are the finest seen anywhere on this island. The yield this year at this place, will be quite large. The imported seed, or the Guatemala coffee, is far superior to the native coffee, and yields double what our native coffee trees do. This coffee is now being harvested, at this place,
and the trees are not only looking well, but they are loaded down with berries, and present a most beautiful sight.

Quite a large cave has just been discovered at Kukaiau, and it is very singular that it has not been discovered before. It is about twenty feet wide in most places, and ten to thirty feet high, and seems about 2,000 feet long. Messrs. Horner & Sons, are also tunneling for water, with the object of fluming the cane, if sufficient water can be got for it. From present indications they will be able to do so.

The new railroad at the Hamakua plantation has proved a success. Though not all laid, enough is down, to prove that it is an improvement over wagons, carts, etc.

At Kukaiau, Mr. Horner will soon experiment with a new method of transportation. This device will consist of wire ropes, wheels, etc., and will work on the gravity plan. The standing wire-rope will be fastened at the mill, and at the highest part of the land, having posts to support it, at the right elevation. It will be constructed so as to be easily moved from place to place. In operation only one wheel will be used for a load of about 200 pounds, and the standing rope will be laid so as to give the load of cane the right amount of speed. The wheels and hooks will be taken off as they arrive at the mill, and will be taken back in wagons to the cane fields. These wheels with hooks, etc., only weigh a few pounds, and can be easily handled and returned to the fields. It is thought this method will prove a great advantage in wet weather and rainy seasons.

The coming or next season's crop of cane is looking well, and promises a large output of sugar for 1897.

"BUCKRA LAND," OR TWO WEEKS IN JAMAICA.

The above is the title of the latest book descriptive of scenes and scenery in Jamaica, the one island of all others in the West Indies that most resembles Hawaii, in many of its chief characteristics. The author is "Allan Eric," of Boston, whose contributions have often appeared in the Planter. His brief description of what he saw and heard in Jamaica will impart to the reader a better idea of the present condition of the island and the habit of its negro population, than many of the larger and more elaborate works
that have preceded it. A few photo illustrations, taken by
the author and his wife, add to the value of the publication.
Mr. Thrum has the book for sale. Paper covers, 95 pages.

We copy a few paragraphs relating to coffee and bananas,
which are among the staple products of Jamaica:

"With regard to coffee in the Blue Mountains, it is the
finest grown in the world, and a large percentage of the crop
is annually contracted for by Delmonico, the world famous
restaurateur of New York. Concerning coffee planting: a
man, we will say, commences by planting, after felling and
clearing a hundred acres, and obtains his first return in five
years. The establishing and up-keep at this period, including
the building of a house, putting up works and machinery,
cost $70,000, and he has, of course, to live until the trees
begin to bear. Considerable capital is therefore required.
The second hundred acres will cost about $45,000, and the
third about $35,000. The return to be expected from the
three hundred acres is estimated at 20 per cent. on capital
outlay. For any one possessing ample means and energy,
there is no more healthy, profitable or pleasant life than
coffee planting in the beautiful climate of the Blue Mountains
of Jamaica.

Sugar was, of course, once the principal staple of Jamaica,
but since emancipation the industry has fallen off, and its
place has been more than taken by fruit cultivation. This is
now a large item of export, valued at $2,000,000, out of a
total value of $8,799,030, sugar amounting to $1,200,000.
Coffee is a yearly increasing article of export, amounting
annually to $1,700,000. The great market of the United
States takes nearly all the sugar, the whole of the fruit and
half the coffee. The bananas and oranges, being of a perish­
able character, naturally go the nearest market—the United
States.

Bananas, like any other fruit, are greatly improved by cul­
tivation. For example—the finest bananas that come to this
country, and those that bring the best prices, are from the
Golden Vale plantations of Jamaica. Jamaica bananas are
superior in quality and flavor to all others. The banana
belongs to the lily family, and is a developed tropical lily,
from which, after ages of development and growth, the seeds
have been eliminated, and the fruit greatly expanded. The banana plant, being seedless, is propagated by suckers, requiring about eleven months for the plant to get its growth, and the fruit to mature. It is very prolific, and it is said that forty plants can be grown on one thousand square feet, which will bear 5000 pounds of fruit annually, and it is possible to grow as much as 175,000 pounds of bananas on a single acre of ground!

The banana plant has a soft stalk, is from ten to eighteen feet in height, spreading out at the top in a cluster of broad leaves, which are from fifteen to twenty inches wide, eight or ten feet long, and of a bright green color. The older leaves, on account of their being constantly swayed by the wind, usually split at intervals of two or three inches, from their edges to the mild-rib, thereby adding to their grace and beauty. Each plant bears only one bunch of fruit, which hangs with the "hands" curving upward, and at the lower end of the bunch, from a long green stem, hangs the blossom—a great heart-shaped maroon colored plummet, about the size of an ox's heart, and much the same shape.

We will suppose that a new plantation of bananas is to be started. The dense tropical growth of brush, trees and creepers is cut down, and when it is sufficiently dried, fire is set in several places on the windward side. A few hours of crackling flame, and the ground is covered with a pall of gray ashes and blackened trunks, which are collected and piled for later burning. The ground is then plowed and dug up, and banana sprouts or "suckers," looking like logs of wood, with a tiny sprout, are set in the rich soil. The suckers are dug either from cultivated plantations, or from where they have been growing wild, are from two to five inches in diameter, and from the small end of each peeps a little bit of green. In eight or nine months after the planting, the plants will have their plumes, sheltering bunches of green fruit, which are ready to cut in two or three months thereafter.

On the plantations, bananas are planted fifteen feet apart each way, the rows crossing one another at right angles. Therefore, when the plants are fully grown their leaves just about meet, excluding nearly every ray of the bright tropical sun from the ground beneath; this arrests evaporation,
and keeps the soil at just about right degree of moisture. After the shoots are planted they require but very little attention until the fruit is ready for cutting; but during the first few months a cultivator is run between the rows to keep down the weeds, which grow very rapidly in rich, hot soil.

A plantation requires to be replanted with new shoots about once in every five years, in order to maintain the highest quality of the fruit, as successive reproduction from the original plant deteriorates the quality of the fruit, and decreases the size of the bunches.

The fruit is cut when it is fully grown but still perfectly green. When the cutting begins, an expert goes over the estate, and he is responsible for the collecting of the fruit in good condition and size.

I have already described the cutting of the bunches. After they are cut they are laid carefully in carts, packed with plenty of “trash” or dry banana leaves, and grass, and drawn to the wharf where the steamer is waiting to receive its cargo. The arrivals and departures of the steamers are timed exactly, and there is little or no delay in loading the fruit.

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ELECTRO PLANT CULTURE.

Editor Planters’ Monthly:—Since my former mention of the application of electricity to agriculture, I have investigated the subject further; the result of which I trust will be, at least, interesting. In Arlington, Mass., there is located the largest vegetable farm in America. On this farm has been conducted a series of experiments with electricity, which proposes to compel nature to forego her wonted daily nap, and enlist her services without intermittance twenty-four hours each day, in the interest of the market gardener.

The application of electricity to aid the processes of nature is not by any means a recent discovery. From the time electricity became a science, much research has been made to determine its effects; if any, upon plant growth. But it was not until 1845 that any great significance was attached to electro-culture as a commercial enterprise; and it is only very recently that it has inspired gardeners with sufficient confidence to warrant its being put in practical use.
Experiments have been performed at Amherst College, an agricultural institution, and at Cornell University, with very satisfactory and promising results.

If electro-culture realizes in any measure what it promises today, the time is not far distant when we shall be able to more than double present production.

On the farm in Arlington, Mass., above alluded to, the possibilities of electro-culture were noticed simply by accident. A number of flower beds had been laid out, on both the east and west sides of a house, but owing to the shade of adjoining buildings the flowers on one side did not thrive. Shortly afterwards, an electric light system was put in by the town, and it chanced that one of the arc lamps was so placed that it shed a brilliant light upon these beds, that were deprived of the heat of the sun. The sudden and startling result was apparent. The flowers, the grass and the trees, that had before been weak and thriftless, seemed to be imbued with new life. Their foliage became deeper in color and more thickly clustered, and a vigorous growth began, which soon rendered them superior to their fellows which had the advantage of the sun's rays on the opposite side of the house. This incident made so deep an impression upon the observer that he resolved to try the effect of electric light upon the plants in one of his greenhouses. His first experiment was with incandescent lamps, which he placed in the hothouse in close proximity to the plants, but no very satisfactory results were obtained. Not discouraged by this failure, he tried again, this time employing arc lights, a row of which he had erected in such a manner that they shed their rays upon a row of half a dozen greenhouses built one behind the other.

The result of this experiment was eminently satisfactory, the plants being larger, thriftier and less affected by mildew than those raised under the usual conditions. These greenhouses were devoted exclusively to the raising of lettuce, and it was ascertained by careful observation of experiments performed through successive years, that the plants raised with the aid of electricity were ten per cent. better in quality and fifteen per cent. quicker in growth than those raised under the ordinary conditions. The most interesting of
these experiments, and those from which the most remarkable results will probably be obtained, are now being made at Amherst and Cornell. At these institutions they are experimenting not only with electric lights, but also with underground wires which go among the roots of the plants to hasten their growth by facilitating the process of assimilation.

Several plots were prepared in the greenhouse at Amherst, all of which had the same kind of soil, and were subject, as far as possible, to the same conditions. Frames were constructed of wood, across which wires were stretched at intervals of about four inches. These frames were then buried in the soil of the plots at a little depth, so that the roots of the garden plants would come in contact with the wires, the supposition being that the current of electricity passing along the wires would decompose into its constituents the plant food in the vicinity of the roots, and thus more readily prepare it for the plants. Two electric gardens were thus prepared, and each was furnished with two common battery cells, so arranged as to allow continuous currents to pass through each series of wires. The results of these experiments are considered to be in favor of electricity. Those plants that were subjected to the greatest electrical influence were healthier, hardier, larger and had a better color, and were less affected by mildew than others.

Experiments with electricity have been recently made in floriculture also, with noteworthy results. The effect of the light upon flowers is very peculiar. At first the light had an injurious effect upon many of the blossoms. The color of tulips was made richer and deeper for a few days, but these flowers soon lost their brilliancy when brought into ordinary sunlight.

The color of scarlet, dark red and blue and pink flowers soon turned into a grayish white. One of these plants bloomed earlier and produced larger blossoms, but they faded early. But by reducing the intensity of the light and by covering them with opal glass globes, the injury to their quality was lessened.

Allan Eric.

Boston, Mass., U. S. A.
REGARDING CANE JUICE CLARIFICATION IN LOUISIANA.

EDITOR PLANTERS' MONTHLY: DEAR SIR:—In the May issue of your journal a translation of an article is given originally published by Messrs. W. P. Kirchhoff and F. C. Thiele in the Chemiker Zeitung.

My object in asking you to publish the following few lines is merely to correct any impressions that the translation may possibly make amongst us on the islands. So far as Louisiana or Dr. Stubbs are concerned with the statement I shall merely say that it is hardly likely that any cognizance will be taken of it in Louisiana, since while Dr. Stubbs and his work are known well and widely, the sugar industry of the States has not had any serious reason for knowing those other gentlemen at all.

Concerning the part of the statement which refers to the use of "Clariphos," I may say that I am largely responsible for the use of that clarification is probably best attested by the simple statement that, at the first, only one, and now two Commercial Companies are engaged in preparing the material, and one of the two houses has found it pay to have a special agent (Mr. R. Churchill) represent it upon the plantations during the past grinding season, as stated by the "Louisiana Planter." However, I personally, have some doubt of its wide application, but only on account of its cost.

Further, concerning the "experts of the school which have applied this method on plantations;" those gentlemen, Messrs. Kirchhoff and Thiele, are most unfortunate in the example they have given. Mr. Sonict, of "Cedar Grove" plantation, sent a communication addressed to "Profs. Stubbs and Maxwell," one paragraph being as follows:

"But for the young man from your school we must have shut down, as our sugar boiler could do nothing with the juice (unripe juice in beginning of season). Mr. Alto said what the trouble was, and I let him have his way, and we have got on all right since."—I quote from memory.

I do not see the need of saying anything more about that statement. I am persuaded, however, that had the translator
made a few inquiries of an elementary kind, his experience and good sense would have prevented him making the translation. I am sir, yours very truly,

WALTER MAXWELL,
Director, Haw. Exp. Station, Honolulu, H. I.

NOTES REGARDING FERMENTATION IN SUGAR HOUSE.

Editor Planters' Monthly:—It is sometimes observed by mill men that samples of juice which have been allowed to remain in bottles or jars a day or so seem suddenly to undergo a transformation into a mucilagenous or at other times a jelly-like body.

The mucilagenous transformation, as far as my observation goes, is brought about by a micro-organism known as Lenconostoc Mesenteroides. This micro-organism feeds upon the sugar of the juice and each individual surrounds itself with a mucilagenous envelope often several times the diameter of the micro-organism itself. This envelope is composed for the most part of dextran, a gummy amorphous body, which brings about the viscous condition of the juice characteristic of this fermentation.

Lenconostoc Mesenteroides thrives best in a slightly alkaline juice of high nitrogen content, for example filter press juice, and when there is free access to the air the destruction of sugar is very rapid. I have seen all but a trace of sugar destroyed by this micro-organism within eighteen hours, and that without any evolution of gas or acid smell. This ferment is generally accompanied by the germs of certain acid-producing ferment notably the lactic and butyric, and if the supply of air is limited the acid ferments get the upper hand and the viscous condition of the juice disappears.

The jelly-like condition of cane juice seems to be another matter. In this case the juice sets to an almost solid jelly, and when turned out will often retain the shape of the vessel in which it was contained. This condition of juice is not nearly as common as the mucilagenous, and in consequence the theory as to its cause is rather indefinite.
According to Plagne*, and it is brought about by an unorganized ferment present in the sugar cane. This is a white non-nitrogenous body which becomes brown and moist on contact with the air, soluble in water but insoluble in alcohol and ether.

From juice which has assumed the jelly-like form alcohol throws down a soft white precipitate which dissolves but sparingly in cold and hot water.

According to Scheibler† this body is not colored by iodine, or converted into glucose by acid, and does not give off ammonia when subjected to dry distillation.

As regards prevention of this change or fermentation, too little is known of the possible unorganized ferments present in sugar cane to justify one in saying anything.

With regard to the mucilagenous fermentation there are certain facts regarding all fermentations brought about by bacteria which are often overlooked or ignored by those who should know better.

The germs of such common fermentations as the lactic, butyric and viscous are present everywhere in and around a sugar mill; and if a certain sugar house product does not ferment it is not because the germs of fermentation are not present but because the conditions are not right for their development.

The conditions requisite for the development of nearly all species of bacteria are moisture, small quantities of mineral matter (ash) and nitrogen, besides the food proper sugar, etc. Moreover, nearly all bacteria demand a slightly alkaline food medium. Because a certain No. 1 sugar which was made by returning No. 3 to the juice, ferments more than straight No. 1; it is not because the No. 3 introduced the germs of fermentation but because the No. 1 so made contained the requisite amounts of moisture ash and nitrogen and the straight No. 1 did not.

Bearing in mind then the easily remembered conditions necessary for the rapid growth of bacteria, it will be seen that neither cleanliness, nor liming of juice can be depended as a preventitive of the fermentation.

* Journ. Pharm XXVI, 348.
† Zeit. f. Rubenzelker XXIV, 309.
If the juice has been properly clarified the nitrogen content of the sugars will be low, and if properly dried in the centrifugals little or no fermentation will take place.

Molasses of all grades is so viscous that fermentation of any kind takes place slowly; that is germs which are present may grow where they fall, but they cannot easily disseminate themselves throughout the whole body on account of the difficulty of motion in so viscous a liquid.

Kohala, Hawaii, June 1st.

EDMUND C. SHOREY.

THE NITROUS CONTENT OF MILL AND DIFFUSION JUICES.

Editor Planters' Monthly.—Bulletin No. 38 of the Louisiana Sugar Experiment Station gives a comparison of the nitrogenous content of mill and diffusion juices of Louisiana canes made by Dr. Maxwell, and the present investigation was undertaken in order to compare the results thus obtained with the composition of tropical cane juices. In order that the results might apply to juices obtained on an industrial scale. All of the work herein detailed was done on juices obtained at the large diffusion house of Makaweli, Kauai, one of the best equipped diffusion plants to be found in cane-sugar countries.

The samples were obtained in the following manner:—Three (3) hands full of chips were taken from each of five cells representing the bottom, middle and top of the cells. These were enclosed in a tin can until the whole sample was collected when the juices were expressed by a powerful hydraulic laboratory press, which gave an extraction of seventy-five per cent. of the weight of the cane. The diffusion juice was taken corresponding to the mill sample, cooled rapidly to room temperature and operated upon at once. The total samples examined represent about one week's work of the factory.

In all cases the ordinary Kjehldahl method for nitrogen was used; the separation of albuminoids by the well-known Stutzer method. Following are the results of total nitrogen
of diffusion and mill juices taken March 12-16, the density of
diffusion juice being calculated to that of mill.

**Table I.—Total Nitrogen in Mill and Diffusion Juices.**

<table>
<thead>
<tr>
<th></th>
<th>Mill</th>
<th>Diffusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>.049 per cent.</td>
<td>.044 per cent.</td>
</tr>
<tr>
<td>No. 2</td>
<td>.021 &quot;</td>
<td>.022 &quot;</td>
</tr>
<tr>
<td>No. 3</td>
<td>.018 &quot;</td>
<td>.020 &quot;</td>
</tr>
<tr>
<td>No. 4</td>
<td>.024 &quot;</td>
<td>.035 &quot;</td>
</tr>
<tr>
<td>No. 5</td>
<td>.021 &quot;</td>
<td>.023 &quot;</td>
</tr>
<tr>
<td>No. 6</td>
<td>.019 &quot;</td>
<td>.018 &quot;</td>
</tr>
<tr>
<td>Average</td>
<td>.025 &quot;</td>
<td>.027 &quot;</td>
</tr>
</tbody>
</table>

It will thus be seen that the diffusion juices contain a very
slightly greater content of nitrogen than the corresponding
mill juice.

In order to compare the albuminoid and non-albuminoid
nitrogen of mill and diffusion juices samples were secured
from this same mill toward the end of April. Following
results were obtained:

**Table II.**

<table>
<thead>
<tr>
<th></th>
<th>Mill</th>
<th>Diffusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total N.</td>
<td>Per Cent.</td>
<td>Albuminoid</td>
</tr>
<tr>
<td>1</td>
<td>.027</td>
<td>.011</td>
</tr>
<tr>
<td>2</td>
<td>.024</td>
<td>.014</td>
</tr>
<tr>
<td>3</td>
<td>.020</td>
<td>.012</td>
</tr>
<tr>
<td>4</td>
<td>.015</td>
<td>.009</td>
</tr>
<tr>
<td>Averages</td>
<td>.021</td>
<td>.011</td>
</tr>
</tbody>
</table>

Following are percentages of albuminoid and amide nitro-
gen calculated on the total nitrogen of the average content
as given above:

<table>
<thead>
<tr>
<th></th>
<th>Mill</th>
<th>Diffusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albuminoid</td>
<td>53.5 per cent.</td>
<td>36.4 per cent.</td>
</tr>
<tr>
<td>Amide</td>
<td>46.5 &quot;</td>
<td>63.6 &quot;</td>
</tr>
</tbody>
</table>

For the sake of comparison we give the results obtained by
Dr. Maxwell on Louisiana cau'es.

Calculated as percentages of total:

<table>
<thead>
<tr>
<th></th>
<th>Albuminoid</th>
<th>Amide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mill Juice</td>
<td>.05949 per cent.</td>
<td>.03122 per cent.</td>
</tr>
<tr>
<td>Diffusion Juice</td>
<td>.03352 &quot; &quot;</td>
<td>.04496 &quot; &quot;</td>
</tr>
</tbody>
</table>

The analysis of mill and diffusion juices at Makaweli point
to the same conclusions that were drawn from an examina-
tion of the Louisiana juices, namely, that while the nitrogen
content from the two presses is not very different in amount,
being slightly higher in diffusion, the diffusion process coagulates part of the albuminoids and extracts more of the amides than does the mill.

Fermentation of Sugar Juices.—The foregoing samples were kept in open bottles and the acidity determined with one-tenth normal soda from time to time in order to see the progress of fermentation.

The mill juices were left untreated, the diffusion juice at collection showed either a faint alkalinity or neutrality with test papers but slightly acid with phenol phthalein solution. 10 c.c. were taken for the tests, as follows:

<table>
<thead>
<tr>
<th></th>
<th>At Collection</th>
<th>After 12 Hours</th>
<th>After 18 Hours</th>
<th>After 24 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1 Mill</td>
<td>1.1 c.c.</td>
<td>6.6 c.c.</td>
<td>8.0 c.c.</td>
<td>9.2 c.c.</td>
</tr>
<tr>
<td>No. 1 Diffusion</td>
<td>0.5</td>
<td>1.8</td>
<td>3.0</td>
<td>4.4</td>
</tr>
<tr>
<td>No. 2 Mill</td>
<td>1.0</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 2 Diffusion</td>
<td>0.2</td>
<td>0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 3 Mill</td>
<td>1.0</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 3 Diffusion</td>
<td>0.3</td>
<td>.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It will be seen that the mill juice began fermenting first, and that the acidity increased very fast. As the fermentation proceeded carbonic acid escaped and the nitrogenous matter coagulated and settled to the bottom leaving the juice clear. The alcoholic fermentation, which first attached the mill juice, soon turned into the acetic. The fermentation of the diffusion juice was quite different, there was no effervescence of volatile products, but at the end of a few days it had changed to a thick viscous and ropy mass in an advanced state of decomposition. While it appears that the mill juice was first attached by ferments there was greater destruction of sugar in the diffusion juice at the end of two or three days standing as will appear from the following sucrose readings, the diffusion juice being calculated to the same density as the mill juice.

<table>
<thead>
<tr>
<th></th>
<th>Mill Juice.</th>
<th>Diffusion.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>9.8 per cent. sucrose</td>
<td>2.6 per cent. sucrose</td>
</tr>
<tr>
<td>No. 2</td>
<td>11.3 “ “ “ “</td>
<td>6.3 “ “ “ “</td>
</tr>
<tr>
<td>No. 3</td>
<td>11.7 “ “ “ “</td>
<td>1.8 “ “ “ “</td>
</tr>
</tbody>
</table>

How far the absence of lime from the mill samples affected these relative results, I am unable to say. These results are similar to those reported by Dr. Maxwell in his work on Louisiana canes.
In conclusion I wish to thank Mr. Fries, chemist at Maka-weli, who placed his laboratory at my disposal, and rendered great assistance in many ways during the investigation.

J. T. Crawley,
Chemist, Haw. Experiment Station.

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FORMULA FOR YIELD OF SECOND SUGARS.

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By J. T. Crawley.

[Below we publish part of an article which appeared in the Louisiana Planter a year ago. Requests have been received for the formula for the yield of second sugars which is given in this article, and we therefore reprint the whole calculation, believing that it will be of interest and benefit to the chem­ists as well as the sugar manufacturers.]

The following problem often presents itself:—Seconds of a given purity are put into cars of a known capacity; on drying the sugars are not weighed, but it is desired to know the yield of second sugars per car. The following formula will be found convenient:—

Letter $x=$ weight of sugar dried.
" $a=$ weight of seconds put into cars.
" $b=$ brix of seconds put into cars.
" $c=$ purity of seconds put into cars.
" $d=$ purity of thirds resulting.
" $e=$ purity of second sugar.
" $f=$ brix of second sugar.

Then—

$A_{bc}=$ sucrose in seconds.
$E_{fx}=$ sucrose in second sugars.

Therefore—

$A_{bc} - e_{fx} =$ sucrose in thirds.

Now, $ab =$ weight solids in seconds, $fx =$ weight solids in second sugars; therefore, $ab - fx =$ weight solids in thirds, and

$ab - \frac{ex}{ab} = d.$

Whence—

$\frac{ab (c - d)}{f(c - d)}$
To illustrate:—The capacity of cars is 21.6 cubic feet; they are filled with seconds, brix 90, purity 55; 90 test seconds will have about brix 96, purity 94. The test shows that the thirds have purity 35.

\[
\begin{align*}
a &= 2.000 \\
b &= 0.90 \\
c &= 0.35 \\
d &= 0.35 \\
e &= 0.94 \\
f &= 0.96
\end{align*}
\]

From formula we have—

\[
x = \frac{2.000 \times 0.93 (0.56 - 0.35)}{0.96 (0.94 - 0.35)} = 63.6 \text{ pounds per car.}
\]

In like manner, had purity of thirds been 45, the yield would have been 352 pounds per car.

In calculating yield from masse cuite, we may consider \( f = 1.00, e = 1.00 \), where a high grade sugar is obtained, although this is not, of course, strictly correct, yet it will answer for practice. The above formula becomes

\[
x = \frac{ab(e - d)}{1 - d}
\]

The rapid application of this formula will not only be of service in calculating hot-room goods, but the point at which the washing of a given sugar ceases to be profitable, the latter of which is a very important question. By the application of the formula it would be a simple matter to calculate the yield from a given lot of thirds, providing, of course, that one knows the house well, and can predict, with a tolerable degree of accuracy, the purity of the final molasses. This would enable the manufacturer to determine the advisability of working up the low grade products.

SUGAR CANE CULTURE.

Mr. Hart, Government Botanist, writes very interestingly in his annual report for 1895 on Sugar Cultivation in Trinidad. He says:—

Although the Botanic Gardens “Bulletin” and “Circular Notes” discuss many details of the economy of Agriculture and Horticulture, yet there are several cultures which I find must not be unnoticed in the Annual Report as its distribu-
tion in some directions is far wider than that of the Bulletin, which is chiefly intended for local circulation. First among these cultures stands "Sugar" and a short review of what has been done in connection with this industry, will I trust, prove interesting. It will be remembered that at the Agricultural Society's meeting of the 11th December, 1894, a resolution was passed in the following terms:—

"That in the opinion of this committee it is desirable to establish at once a small experimental plot for growing and testing seedling varieties of cane, and that a Sub-committee of three be appointed to carry out this object."

The sub-committee met, and it was unanimously decided that a small experimental plot should be started at the Royal Botanic Gardens under the immediate supervision of the Superintendent, and this course was recommended in the report of the committee which was adopted by the Society in March, 1895. The sub-committee recommended that this course was advisable for the following reasons:—

1st To test the value of the seedlings in comparison with older varieties of sugar cane.

2nd To prove their suitability for cultivation in our climate and soil.

3rd To provide a depot for the supply of plants for extended cultivation.

4th To test the value of manure in all stages of the growth of the cane.

It was stated in my annual report for 1894 that several varieties of seedling canes had been received from Demerara, and some from Barbados.

The culture of these varieties has been conducted with the greatest care and the reasons for the establishment of the cultivation given as above, have been kept most fully in view, especially the first, as it is considered that the object should be to select the best canes out of the many varieties so as only to propagate those which give promise of the best yield. After this is fairly ascertained, the next object will then be to test their suitability for culture in Trinidad. It is well known that the soil at the gardens is of the very poorest class, but this will, we will, we think, be not a little advan-
tage in the forthcoming trials, as canes that will grow and produce good results on such a soil. can hardly fail to do so when planted in better lands. Thirdly we shall endeavour to supply all requisitions for plants on equal terms, working up for the purpose a stock of plants which will be distributed at a stated time to applicants, so that all may start their culture at the same time, and no advantage will be afforded to one more than another. It is expected that it may be possible to give the results of the first year's trial in an appendix to this report, but in case this work cannot be carried out in time, I may now state that I have received information from Messrs Jenman and Harrison that the previous results have been fully confirmed by the crop which has been reaped in the British Guiana experiment grounds during 1895. These results show that there are several canes among the seedling which give a return so far surpassing the Bourbon and other older varieties as to induce the hope that by their extended culture, the sugar industry will receive a substantial benefit, one, sufficient of itself to disperse the gloomy views which have lately been held as to its future. It would appear that the trials of the different manures need not be carried out with haste, as the work of the Demerara experimentalists shows in a most complete and forcible manner, the direction in which success lies, and that all that need be done, at least at present is, to prove by experiment that the same manure can be used in the Trinidad as on the Demerara soils; but even this trial on the experimental grounds will, I fear, not be sufficient for all wants, insomuch as the character of the soil in Trinidad estates varies in a large degree, and what would be suitable on one, would not be applicable to others.

Extended trials should therefore be made by the planters themselves, on the various soils, but if they submit to be guided by the results obtained in Demerara, it will, I feel assured, conduce to greater success in the matter of cultural proceeding.

The destructive character of the cane fungus *Trichosphaer*a *sacchari*, has been accentuated by the fact that it has, during 1895, been found present on estates in British Guiana, where a considerable loss is attributed to its action. As mentioned in last year's report "further observation is still required to
show to the full extent of its spread, and the measure of its destructiveness." I have received reports from some, that burning the fields have lessened the amount of damage, but on the other hand it has been shown that the burnt areas when replanted have again been badly attacked. Our seedling canes were planted on and near to a spot on which canes infected with disease had been growing, for the purpose of showing their power of withstanding attack. During 1895 the land on which they were grown was carefully cultivated and the canes were "trashed" at frequent intervals.

The disease is however present in a minor degree in all, but to some varieties little harm has been done, and only one or two really rotten canes have been found.

This fact points the way for further improvement, for it is possible that we may be able to select from the varieties under trial some kind, or kinds which will really be disease resisting varieties, and large sugar producers. I mentioned in my last report that the cane plot would be given good cultivation, to test whether it would have any effect on the progress of Trichosphaeria. It is, I think, quite clear from the appearance of the canes, that the attention given them has not been in vain, and that the fungus has, in consequence been kept in check; as there is certainly, not so much in the plot as there was during the previous year. The attack by "termites" or "white ants" however still continues, and many canes are cut off at or slightly above the ground line.

The element of yield per acre must be well considered in conducting an experiment of this kind for a cane yielding high saccharine contents, may be a poor cropper, while a cane yielding moderate sugar contents may give a very large weight of cane to the acre, and thus be more profitable to grow than one yielding higher sugar contents. It would appear desirable therefore, first to select the varieties having high sugar contents, and from these secondly to select those of a vigorous constitution and disease resisting power, and thirdly, those which will afford the largest yield. These objects are well brought out by Messrs Harrison and Jenman of British Guiana in their reports, and it cannot be doubted that it is the proper plan to secure the best results, as it is one which has long been followed by the Agri-Horticultural
The world in European countries, in dealing with numerous economic plants and especially with the sugar beet, with unvarying success. To fully carry out the idea, it is however necessary to take seeds again and again from the beet seedling and other canes after test, and by that means ultimately secure varieties of the very highest class, 1st as sugar producers, 2nd as disease-resisting varieties, and 3rd as crop producers.

Why sugar producers are placed first is, that by their use, a larger crop of sugar is produced from a less number of tons of cane; and therefore labour all round, in both culture and manufacture is reduced. Disease-resisting varieties are placed next, for it is certain that if we have a cane giving a high yield of sugar, but liable to be attacked by disease, the actual yield to the planter will certainly be less than with a kind producing less sugar, but not suffering from disease. Canes as “crop-producers” have been placed last in view, as it is evident that a heavy yield of canes, inferior as sugar-producers, will lay a great burden upon the planter for carriage. A heavy yield by a high sugar producing cane is therefore the ultima thule of the planter.

Altogether the outlook for the Sugar planter in so far as regards seedling canes, appears to be a very promising one, and especially so as it can be shown in reports from Louisiana and British Guiana that canes are now in cultivation, which have, for four years in succession, not only given as many tons per acre as the Bourbon, but have given an increased yield of sugar contents over that variety while maintaining a good disease resisting form for growth. There can therefore be little doubt that the sooner the older varieties are replaced by the best of the seedling kinds, the better for the sugar industry; as it must now be conceded that these varieties are, especially in some districts and in some soils, distinctly inferior to the newer kinds. There is also another point which will not be lost sight of in conducting the cane experiments. It has been noticed that some of the newer canes mature much more rapidly than the older varieties, and one special kind is under observation, which has, under seven months, produced canes nearly twice the length of the other varieties planted at the same time, and I have to-day
tested the specific gravity of the juice from a cane taken from the “stool” when it gave 1.040 by balance, not a high density by any means, but still, somewhat remarkable for time of growth. There are at least eight or nine canes of the same size and length, at each stool, grown from cuttings (tops) planted 8th June, 1895, and consequently six months and twenty-two days old on 1st January, 1896. Such a cane I take it would be invaluable to the planter as a “supply” cane. The probability is that the density of juice will improve with age so as to render it little less in value than that from standard kinds at crop time in March.—Trinidad Daily News.

—:—:—:

CULTIVATION OF TOBACCO.

The Agricultural and Immigration Department of the Florida Central and Peninsular Railroad has issued the following circular, being the second in the series treating of tobacco culture:

TRANSPLANTING.—When plants are large enough to be transplanted, i. e., from three to six inches high, don’t wait too long for rain, but water and set. Use a narrow, rather thick paddle, instead of a long peg; avoid making the hole deeper than the plant is to be set; press the dirt well around the roots. Set deep, for if the bud is left above the ground the plant will live and grow. A few days after setting, go over the ground and reset all the missing places; repeat this operation until there is a stand. Bear in mind that the richer the soil the closer (in reason) can plants be set in the drill. Distance for Sumatra plants 12 to 15 inches, second year’s Cuba plants from 14 to 18 inches, with rows four feet apart. First year’s Cuba plants can be put the same distance as Sumatra.

CULTIVATION.—This should be done with the hoe and sweep and light running cultivator. As soon as plants take root, say 10 or 12 days after setting, go over the field with the hoe removing all grass and weeds from near the plants, drawing the earth slightly to them. Avoid deep plowing. Keep the crop well in hand, so that it will not be necessary at any time to work deep on account of grass and weeds.
Worming.—The cut-worm often appears soon after transplanting, this is particularly the case where barn-yard or stable manure has been used for fertilizer. As soon as its presence is discovered, use the mixture of Paris Green and corn meal recommended for plant beds, viz., one heaping teaspoon of Paris Green well mixed in a gallon of corn meal. Allow the mixture to stand twenty-four hours before using so that the poison may fully permeate the meal, apply around the plants with a perforated tin can, something like a pepper box. Bud-worm, tobacco’s greatest enemy, is the next to dread; again use the Paris Green mixture; take a pinch of the mixture and put it in the bud. It requires close observation to detect this incidious enemy, so don’t be deceived, better go over the crop once every eight or ten days, and put on the poison, even if you do not see the worm. The next in the line is the horn worm; its appearance may be looked for in May. Although this, the first crop, is not much to be dreaded, yet precautionary measures had best be taken. Use Cobalt dissolved or mixed in syrup, made of sugar and water, or honey diluted, put a small quantity into the blossoms of Jamestown (Jimson) weed, place these around the field late in the afternoon, i.e., just about sunset, use small pieces of board with auger holes to set the blossoms in. Nail these boards or small stakes about three and a half or four feet high. This poison will destroy many moths, tobacco flies, which deposit the eggs producing the worm, but don’t depend upon poisoning process entirely; go through the crop and hand-worm; in the heat of the day the worm will be found on the under side of the leaf.

Topping and Suckering.—It is a difficult question to decide, under the variable conditions surrounding a tobacco crop, the best time to top the plants. Great care should be exercised in this matter, for if topped too soon the leaves will grow too thick and leathery, unfit for wrappers. So let the growing condition of the crops be your guide. When plants are not growing vigorously, showing signs of exhausted soil, or fertilizer, top at once, or as soon as the button appears. On the contrary, when they are growing well, especially when there is a tendency to speck, do not top until just before blooming, and then only break off the bud. This
latter advice applies more particularly to the "Sumatra" variety. All stalks will not do to top at the same time. Neither will all be ready to harvest at once. Suckers will appear sometimes before topping; they must be broken off when found. "Cuba" plants throw out more suckers than "Sumatra." When bud-worms have injured a plant seriously, cut it down and permit a sucker to grow in its stead.

Harvesting.—When yellow blotches or spots appear on the surface of the leaf, tobacco is ripe and ready to harvest. With "Cuba" tobacco I am aware that the usual plan is to cut the entire stalk, but to my mind it has been fully demonstrated that much green tobacco is taken into barns by this process. I therefore advise priming off as they ripen, a sufficient number of leaves from the bottom, so as to allow at least two-thirds of the entire stalk to ripen before cutting, then cut the stalk down with a strong sharp knife to avoid splitting. Be careful not to cut while there is due or rain drops on the leaves, as water will produce black spots. "Sumatra" tobacco must be harvested entirely by priming or stripping process. Take off the leaves as they ripen, from bottom to top. Be careful not to allow tobacco to remain in the sun long after it is gathered, for sunburn will occur in a very short time. Do not lay tobacco on the ground without some protection from sand and dirt. Leaves may be gathered in a long flat basket, if care is taken in passing through the field. A good plan is to lay the leaves on the arm as gathered, depositing from time to time in some shady place. Great care must be taken to avoid bruising the tobacco, bearing in mind that the most perfect leaves make the most desirable wrappers. If the barn is some distance from the field, keep the tobacco covered while in transit.

Barn Handling.—First of all, have clean boards to place the tobacco on as received in the barn. Don't place the piles too thick as there is danger of heating if allowed to remain too long before handling. For hanging cut tobacco use laths about 4 feet 4 inches long and 1 1/4 x 3/8 inches thick, slightly sharpened at each end, then, with the assistance of an iron spear on one end of the lath, and the end other placed in an auger hole, bored at an angle of about 45 degrees, in a post or tree, place the stalks on the laths, at a distance of 4 inches
apart, pass the spear through the stalk far enough from the end to prevent splitting out. As each lath is filled remove the spear and place the laths on the lower tier of the barn, about 6 or 8 inches apart. The next day it can be raised on the higher tiers to make room for the freshly gathered. If the field is some distance from the barn the spearing may be done near the field, and tobacco brought in on a rack, instead of a regular wagon body. Primed leaves can be hung on stout wires, sharpened at the end to pass easily through the stem of the leaf, or the laths may be used with a cord and needle to string on, the lath serving only as a support. The length of lath given will hold about 32 leaves, distance of less than an inch apart between the stems; put the leaves back to back. During the early stage of curing and until the tobacco begins to yellow, keep barn ventilators closed during the day, and open at night during bright clear weather. After the yellowing process has fully set in reverse this order; open in the day and closed at night. When tobacco is sufficiently cured to take down and bulk, it may be again necessary to close during the day and open at night, so as to keep it soft and pliable for handling. When the stem is fully cured, the tobacco should be taken down and put into hands or bundles, for "Cuba" tobacco, from 15 to 20 leaves, and "Sumatra," 25 to 30 leaves to the bundle, being careful not to mix the two varieties in the bundle. Of course for cut tobacco, where leaves have been cured on the stalk they must be stripped off before they can be put in the bundle as soon as tied into hands bulk it down. Do this by lapping the leaves, leaving the stem ends outward; keep the bulk covered with blankets or burlap to prevent drying out. While making the bundles a partial selection of two or three grades may be made. Should there be a long rainy season during the curing period, the barn must be kept closed; if signs of mould appear on the leaf near the stem, open the space between the laths on the tier poles; a little fire may be necessary at this time for drying out the humidity. Charcoal heaters made of sheet iron are the best to use for this purpose, but small fires made from dry sap pine or some other wood that will not impart its odor to the tobacco will do. All that can be said in connection with barn handling must
be taken as general advice, subject to change under certain circumstances or conditions. So use your best judgment coupled with good common sense, bearing in mind these facts. The early or yellowing process must not be too rapid. In more advanced curing give ventilation in good weather. When cured give humidity sufficient to soften.

MODERN BARNs.—A barn of the following dimensions will furnish ample room to house 5 acres of tobacco: Width 28 feet 8 inches; length, 64 feet; height, 18 feet from top of sill to plate, or 20 feet from ground to plate; tier poles 4 feet apart each way for cut tobacco, and four feet wide by 2 feet high for primmed tobacco; double doors on the side opposite each other, wide enough to admit a wagon and about 9 feet high; windows on sides and ends about 4 feet wide and 7 feet high, 4 or 5 feet apart; stationary ventilators in gable ends. All doors and windows to be hung so as to open horizontally. This barn will cost from $350 to $400, if built of first-class material. In the southern part of the state, where tobacco is grown experimentally this year, I do not advise building expensive barns. With some changes orange houses or sheds can be safely used.

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DIFFUSION OF KNOWLEDGE.

There is absolutely no use in knowledge except it be practically applied: the discoveries of the laboratory are of no avail unless they are turned to the use of man at the bedside, in field or factory to heal his ailments, or to minister to his wants. Every scientific discovery must be stamped with the royal mark of "utility" before it can be passed as current coin among the workers of the world. Mankind want truth,—the simple truth in simple language, so that he who runs may read. Busy men want those bits of gold on which the miners in the dark stumbled often by chance, presented to them, not wrapped and hidden in semiforeign verbiage, which although useful in its place may be used to conceal the truth instead of revealing it, but so that the busy worker may at a glance see, understand, and be in a position to prove. Journalism has done more to disseminate useful knowledge amongst mankind than any other agency. The journalist
has been the true educator. It is impossible to take up the most ordinary periodical without finding some useful fact presented in ordinary language for daily and homely use. Without this journalistic office, there could be no advance, no progress, no selection of the fittest, no controversy on doubtful points of practice, no opening for the busy worker with his practical experience, the result of observation, to enter in and stamp the matter with the single word of approval, which can only be impressed on those solid truths which have the ordeal of experience, and in the world's mint have been approved useful.

The miner unearths the metal, but it is the banker and the merchant who give it value: So too with "knowledge" it has no value until it has been turned to account by daily workers. It must be conceded therefore that science exists for working men, and that all scientific work is valueless until it has been approved by them: moreover every addition to knowledge, every addition to truth whether made by the laborer in the field, by the farmer or by the professional scientist, by the wayfarer or the professor—no matter by whom—so long as it is absolute truth, and can be so marked, belongs to the category of science: and its value will depend entirely on the results of observation and experience. In all scientific matters which relate to agriculture, the planter or the farmer is the ultimate judge and referee, just as much as the physician or the surgeon is in his own domain. Indeed the laboratory bears the same relation to the agriculturist as it does to the physician; and neither can accept the discoveries, much less the dicta, of the departmental laboratory without first subjecting them to practical proof, nor can physician or agriculturist venture to feed or dose with the products of the laboratory until their usefulness, and their power for evil or good have been thoroughly ascertained. There is absolutely no other mode of test open to physician or agriculturist than that of actual experience, and those who would, if they could, compel the agriculturist to take things on trust belie themselves when their own bodies are sick unto death, for then they by no means desire to be dosed in accordance with the results of analysis but according to the experience of the physician in whom they trust.
But without daily trial how could that physician gain experience: and how could he verify that experience without the advantage of medical journals in which diverse opinions are expressed by other workers in the same fields: neither can planters and farmers arrive at safe conclusions without the aid of journals in which are expressed freely and openly the views and opinions of their fellows.

Journals, medical, agricultural, scientific or other, value the merely scientific at its face value just as men do paper currency—it may be worthless or it may equal gold,—but they prize, income, and store up approved and tested knowledge—real science—absolute truth: To preserve truth, to free it from the mass of rubbish in which it too often lies concealed, to present it fair and untarnished to the eyes of men is the noble work of journalism—its true province: and let it not be forgotten that truth is equally valuable whether found at the bedside of the pauper or the sovereign, in the field or the laboratory, by the humble laborer with hoe in hand, or the degreed professor with his costly appliances. Journals therefore which represent any very great field of labor cannot be restricted so as to represent only a department of that labor,—to be really useful their work must be whole, entire, representative, and this it can never be if confined to the “departmental,” it must give voice to the work, and if devoted to agriculture its pages should be filled with observations from field as well as from laboratory, and it will be found that no matter how humbly expressed the former will almost invariably outweigh the latter in practical value. Planters are too reticent,—frightened by scientific bugbears, these graduates in nature’s university, because they have not the art and knack of the schools, are afraid to record their priceless observations; hence it is that much valuable experience which ought to be recorded in the pages of this journal is annually lost to us, buried with the observers who gathered it.

Planters are afraid of criticism, they dread these students of nature, lest some scientific sledge hammer smash their poor little observation all to bits: they are deterred by a bogy, and forget that great truths have been discovered by unlearned men, and that truth itself is immortal, even when
clothed in the humblest garb that the unlearned tongue can weave.

A journal, especially a medical or agricultural journal, only exists as a storehouse of thought and observation—its object the truth, and this noble purpose can never be fulfilled,—unless its pages are open to all who have some offering to bring: Muzzle it, restrict it to the few, banish from it opinions, views, controversies on matters of public interest that lie within its province, and it is a dead thing; however valuable as a special report, it is valueless as a journal.—*Barbadoes Ag. Gazette*.

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**OUR RICH MOTHER COUNTRY.**

The budget is probably the most interesting subject presented to Parliament. Sir Michael Hicks Beach, Chancellor of the Exchequer, in introducing the budget, said:

"The deposits in savings banks and permanent accounts in ordinary banks have mounted to an unprecedented point, and the production of gold throughout the world has been the highest ever known. The amount of bullion in the Bank of England was £49,000,000, and the reserve fund in the bank, in proportion to its liabilities, was the highest on record."

A big reserve means idle money, and that is evidence of a lack of confidence and depressed business. Is it possible that this big reserve is in part due to a lack of faith in this country because of its position regarding the currency? Would a fixed financial policy on a gold basis set loose the Bank of England reserve?

Continuing, Mr. Beach said that the position of the workingmen was never so satisfactory as at present, but he feared the condition of agriculturists was worse. The great triumph of a Chancellor of the Exchequer, he said, was when the receipts and estimates were equal, but the figures of this year became remarkable by the fact that the receipts exceeded the estimates. Everything, he said, had had an upward tendency, especially during the latter half of 1895.

The increase in the value of exports, imports, railway earnings and bankers' and clearing-house returns showed a continuous expansion of trade. The revenue for the fiscal
year had been £101,974,000, while for the year 1894-5 the revenue had been only £94,684,000, showing an increase of £7,290,000, and making an excess of £5,812,000 over the estimates.

A great feature had been in the increase of the revenue from tobacco, wine and tea, the latter having steadily driven coffee out of the market. British and Irish spirits had also driven foreign spirits out of the market. The import of spirits had declined 19 per cent., and the popular taste for rum was greatly lessened. Tea had yielded £120,000 over the estimate, implying an increased consumption of 10,000,000 pounds of that commodity. In connection with this, he added, there was a large and welcome transfer of the tea trade from China to British India and Ceylon.

The receipts from wines, he said, had been £1,256,000. This seemed to be largely due to an increased consumption of vinous liquors by members of the Stock Exchange and speculators, who, it appeared, consoled themselves in non-success and rejoiced in success in the consumption of champagne. In this way he accounted for the dealings in 1,200,000 extra bottles of champagne.

We sandwich here the following table showing the imports from and exports of merchandise to the United Kingdom, for 1892 and 1893, the years of prosperity under the McKinley tariff, and in 1894-95 under the Wilson Act of 1894:

**IMPORTS MERCHANDISE.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Dutiable</th>
<th>Free Duty</th>
<th>Total Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1892</td>
<td>$120,933,703</td>
<td>$35,367,178</td>
<td>$157,300,881</td>
</tr>
<tr>
<td>1893</td>
<td>130,693,296</td>
<td>43,164,473</td>
<td>182,857,769</td>
</tr>
<tr>
<td>1894</td>
<td>82,908,702</td>
<td>24,464,293</td>
<td>107,373,005</td>
</tr>
<tr>
<td>1895</td>
<td>108,669,144</td>
<td>50,414,099</td>
<td>159,083,243</td>
</tr>
</tbody>
</table>

**EXPORTS MERCHANDISE.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic</th>
<th>Foreign</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1892</td>
<td>$493,957,868</td>
<td>$ 5,357,464</td>
<td>$499,315,332</td>
</tr>
<tr>
<td>1893</td>
<td>414,966,094</td>
<td>6,178,457</td>
<td>421,144,551</td>
</tr>
<tr>
<td>1894</td>
<td>429,988,879</td>
<td>7,090,388</td>
<td>437,079,267</td>
</tr>
<tr>
<td>1895</td>
<td>384,132,970</td>
<td>2,992,488</td>
<td>387,125,458</td>
</tr>
</tbody>
</table>

Note that the imports in 1895 were greater than in the banner year 1892, and that the per cent. of duty free goods was nearly 50 per cent. more; that the exports in 1895 were over $100,000,000 less than in 1892!

"After referring to the great increase in the excise and..."
death duties, the Chancellor turned to the expenditures of the Government, which, he said, had reached the total sum of £97,764,000, leaving a surplus of £4,208,000, which would be applied to the national defenses, as explained in the National Works bill. During the year, he continued, the national debt had been reduced £8,134,000, the largest reduction on record with the exception of the reduction during the year 1894–5. The unfunded debt stood at the lowest point it had reached in twenty-one years, and the funded debt had not materially increased since the Crimean war. In thirty-nine years, he explained, £190,000,000 of debt had been paid off, £100,000,000 of which had been paid in the last thirteen years. The country, Sir Michael said, might be proud of the enormous revenue, but it was, in his judgment, a grave question whether the expenditure was not increasing faster than the permanent capacity of the nation could bear."

What this country needs is such a policy as will secure the confidence of the money kings of the world; freer exports of domestic merchandise; increased imports of raw material and larger exports of manufactures. The speech of Sir Michael Hicks Beach is unusually full of meaning for Americans. England has the ships and the money, too, and we want more of both.—American Grocer.

CHRISTIANITY AND COMMUNISM.

We firmly believe, says the American Grocer, that the principles established by Jesus Christ, if properly put into practice, will cure the evils of society, as well as those which afflict the units of society. It is astonishing to note the increased interest in the teachings of Christ. During Lent one of the remarkable sights incident to downtown life was the crowding of Trinity Church by business men—most of them between twenty-one to fourscore—eager to hear the practical application of the Gospel of Christ to the affairs of every-day life. The closing of the Exchanges on Good Friday and the more general observance of Easter mark increasing interest in Christianity. In the political world it finds expression in the efforts on both sides of the Atlantic to
bring about a Court of Arbitration for the settlement of international disputes.

A few weeks since, Rev. Lyman Abbott, D. D., preached a series of sermons on "Christ's Teaching on Social Topics." In one upon the relation of Christianity to Communism, the evils of acquisitiveness were discussed. The distinguished preacher said that communism is, primarily, the doctrine that all property should be held in common. The Bible, he contends, maintains no such doctrines and contains nothing which favors such doctrine.

"The New Testament approves private property. It approves difference of private property; one man has one talent, one has five, and one man has ten. The ambition to acquire property is a worthy ambition, provided it is under right direction and guided to right ends. The first duty a man owes is the duty of earning his own livelihood and the livelihood of those who are intrusted to him. This is one of the foundation virtues. It underlies all civilization, all commercial well-being, all individual manhood. When acquisitiveness rules and love serves, the man is wrong; but when acquisitiveness serves and love and charity rule, the man is right. The ambition to acquire, if acquisition is made subordinate to high and noble ends, is a noble ambition.

"Christianity puts no discouragement on industry. Christ's cure for the evils of acquisitiveness is not communistic. It is that intimated in the parable of the talents. Property is a trust. Whatever you have is given to you that you may use it in trust for others—to one man one talent, to one man five, to one man ten, but by and by an accounting. And that doctrine does not rest on one parable alone, it runs all through Christ's instructions. So to a man who built his barns and got them stock full to bursting, and then said, 'Go to, I will build more barns, and put in more grain and corn, and say, Sit down, my soul, and enjoy thyself'—to him Christ points the finger of scorn, and says, 'Thou fool.' He has not known anything except how to get; he knows not how to distribute. Men called him wise and sagacious and prosperous and successful, and God says, 'Fool!' America is full of fools who do not know how to do anything with a dollar except to use it to get another dollar. Christ portrays the
judgment. What is it? The men who have known how to use their property so as to clothe the naked, and feed the hungry, and help the suffering, are on the one side, and the men who have not are on the other. Property is a trust; and every man who has property, whether it is one dollar or fifty million dollars, is a trustee. In the one case he has a little trust and in the other case he has a great trust; but that is the whole difference. This teaching of Christ is not poetic nor fanciful. It rests on a scientific basis.

"What a rich country this is! How we have grown in wealth from fourteen thousand million to forty-four thousand million in a quarter of a century! So Mr. Blaine said a few years ago. Wonderful growth in wealth! Now, where did it come from?"

"A considerable part of it was found here when the first immigrants arrived; coal, oil, gold, silver, iron, juices of the earth in the prairies, great forest trees, great navigable rivers. We did not put the coal in the mountains, nor the gold and silver in California and Colorado; we did not make the prairies of the United States, we did not plant the forest trees. They were here when we came here. They are not the product of our capacity, our industry. They belong to Him who put them here. And unless you suppose He put them here for the benefit of a few men, unless you deny that He is the Father of whom the whole family on earth is named, then they were put here for the benefit of the community; and whether they are administered by the nation as a nation, or by individuals whom the course of events has given control of them, they are a trust for the community that dwells here.

"The second great sources of our wealth are the great natural forces—gravitation, electricity, steam—the forces with which God has endowed nature. We have learned how to set these forces at work. They are grinding out our grist for us. In the old Hebrew tale we have the story of that giant Samson, who was blinded and then set to grinding for his enemies. Here in America, God Almighty is grinding for His children. It is we that are blind, not He. And there is not a spark of electricity that runs across the wires, not a sound that trembles on the telephone, not a throb of steam
in the machinery, not a drop of falling water in the cascade, which is not the work of God. For whom? For half a dozen men? No! For His entire family. And the half a dozen men who control the telegraph or telephone or steam engine are trustees. God has given them the trust, and God will call them to account for the right using of it.

"The third great source of wealth has been the great highways of the nation. Formerly our means of transportation were poor, and the highways were free. Now the means of transportation are admirable and the highways have become private property. The railroads are the arteries, the telegraph wires are the nerves, and when the arteries and the nerves pass under the control of certain individuals, the body politic is under their control.

"Alexander Hamilton said: 'Give a man power over my subsistence, and he has power over my whole moral being.' The men who control the highways of the nation control the subsistence of the nation. If such control is admissible at all, it must be exercised in trust for the nation. That is Christianity; it is now also law. The courts have said, the courts of the state, the courts of the nation, 'These highways belong to the nation, and the corporations are trustees of the nation, and are subject to the authority of the nation.' To that extent Christianity and the law of the land have come to be identical.

"It does not follow that all this property is to be held in common and administered in common, but it does follow that every man who controls any part of this property, whether it has come from mines, or from natural forces, or from public highways, or from what he calls private enterprise, has taken it from the hands of God, and is to administer it in trust for humanity. That is the doctrine of Christianity. It leaves to the people individual enterprise, and the variation of wealth and of condition; but it maintains this fundamental principle: that every man is a trustee, and every man must account for the administration of his trust."

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Every young man who reads this pamphlet, should not omit perusing the article headed "Perseverance and Patience" on page 286.
HINDUS AT TRINIDAD.

One of the most interesting excursions which the traveler can make in Trinidad is to the coolie village. The coolie village in connection with Port of Spain is about three miles from the town. The road thither is lined with bamboo thickets and rows of palm trees, and their shade is appreciated in this tropical region, where the direct rays of the sun are painful and dangerous. We drove through uncleanly suburbs where black vultures were feeding upon garbage, and soon came to the village. It is a collection of shanties by the roadside made of boards or of palm thatch supported on bamboo props. In front of each were men, women and children; a totally different race from the negroes or the black West Indians. Clothed in his long white linen gown, with a turban on his head, or with nothing on but the scarf twisted about his loins, the Hindu bears himself with dignity and reserve. His features are delicate and clear-cut, his manners are those of a civilization of which the negro knows nothing, and which indicates the sway of mind over matter. He may be a degraded heathen and know little more than the African, but he does not thus impress the visitor. He has the gravity of the sphinx, and an aristocratic bearing which is out of harmony with his environment. One instinctively connects the negro with the animal creation; it would be impossible to imagine the Hindu as anything but a man. Even when seated cross-legged before a little charcoal furnace fashioning silver and gold ornaments out of coins, or carrying loads, or working in the fields, there is something in shape or movement or expression that indicates mental power, a descent from a cultured ancestry, a superiority to present conditions. Much of this is doubtless due to the contrast which is presented in such a place as Port of Spain between the noisy and loose-mannered negroes of the town and the silent, self-contained coolies, who dwell apart in their own village; but circumstances will not wholly account for such marked differences as are seen in the races. There are many thousands of these coolies in Trinidad, and upon the whole the arrangements under which they emigrate and work in the island are beneficial to employer and employed.
They are brought from Hindustan at the expense of the colony under the care of government agents, and are, of course, well cared for and fed during the voyage. On arrival those who are in good condition are apprenticed to owners who desire them, for five years. Families are not allowed to be separated except in the case of children who are over fifteen years of age. They are bound by law to work nine hours a day for two hundred and eighty days in the year, and receive the regular rate of wages. The law punishes the coolie for wilful idleness, and the employer for any fraud in his dealings with the laborer. For the two first years a part of their payment consists of rations, but for the rest of their time they are paid in cash. Each estate employing coolies is obliged to provide a hospital, which is under the inspection of a medical visitor, and all the labor arrangements are subject to the inspection of a government agent, who visits the estates constantly and reports each week to the Agent-General of Immigrants. He in turn reports to the Governor, who has absolute authority to cancel the contract and remove any or all of the coolies from an estate. The system is a good one, provided only that the agents and the Governor are of high character and faithful in the discharge of their duties; and so far as I could learn, it has worked well in Trinidad.

When the five years of indenture are ended, the coolie can make a new contract for a year or he can work for whomsoever he chooses. After he has been in the colony ten years he can claim a free passage home to India, or he is allowed to receive instead of that claim a government grant of ten acres of land. The coolies have usually preferred the former, though some have settled permanently in the island and others have returned for a second term of service, bringing friends and relatives with them. Though these Hindus are all low caste, yet they do not amalgamate to any extent with the other blacks. They dwell by themselves as far as possible, they have a priest of their own religion, and they live a simple family life; they are jealous of their marital rights, extremely fond of their children, frugal in their expenditures, and as well behaved as any class of the community. They live mostly in the open air, for in the climate of Trinidad a
house is only for a shelter when it rains or a place to sleep; and a hammock under one of the umbrageous trees is more attractive here than the best bed under a roof. A charcoal brazier and a brass pot, with a few jugs and dishes of coarse pottery, comprise all the household furniture which the coolie needs. Rice and cassava root, with the fruits which are ready at hand supply their scanty meals. They have little, but their wants are few; they have no debts and no duns; no clothes at the pawnbroker's, and very few anywhere; they are accumulating gold and silver pieces to support them for the rest of their lives in Hindustan; they will go home to a blissful Nirvana, or to its equivalent, in their simple imaginations.—"Augustus," in New York Observer.

"WHAT IS A DOLLAR? THE QUESTION ANSWERED.

This question has been asked as though there could be a doubt as to what answer, sustained by authority of law, can be given to it.

ONE DOLLAR.

July 6, 1785, a resolution on coinage was adopted by the Continental Congress adopting the decimal system of accounting and declaring one dollar to be the unit of monetary arithmetic.

April 2, 1792, a law was enacted establishing a United States mint, one provision of which declares that money accounting shall be by the decimal system, of which one dollar is the unit. No subsequent legislation has changed this provision of the law, therefore one dollar is the legal unit of the money of account.

VALUE OF ONE DOLLAR.

April 2, 1792, the first coinage act after the adoption of the United States Constitution, declares that a ten-dollar gold piece, equal to the value of ten units, shall contain 24.75 grains of pure gold; a one-dollar silver piece, or unit of value, shall contain 371.25 grains of pure silver, and that the ratio of value between gold and silver shall be 1 to 15.

The value of one dollar under this act was 24.75 grains of
gold, or 371.25 grains of pure silver when equal in value with 24.75 grains of pure gold.

February 12, 1873, a law was enacted revising the coinage laws, in which the coinage of silver dollars is not provided for, and declares that one dollar shall contain 25.8 grains, fineness 900, of gold and that such dollar shall be the unit of value. This provision of the law has not been changed by subsequent legislation, therefore one dollar is the legal unit of value and the value of the unit is 25.8 grains, fineness 900, of gold.

ALL OBLIGATIONS ARE PAYABLE IN GOLD, OR GOLD VALUES.

September 17, 1789, the Constitution of the United States was adopted containing a provision that contracts, public or private, shall not be impaired by legislative enactments. This provision of the Constitution has not been subsequently changed.

All public and private contracts, expressed in the money of account, use one dollar as the unit of accounting, and the value of this unit since the act of February 12, 1873, is 25.8 grains, fineness 900, of gold, therefore all such public or private obligations are payable in gold at the rate of 25.8 grains, fineness 900, per dollar, or its equivalent in value at the option of the creditor.

Since the United States Constitution prohibits the impairment of contracts by legislative enactment, if Congress should enact a law making 371.25 grains of pure silver the measure of the unit of value, all public and private contracts created prior to its enactment would be payable in gold at the rate of 25.8 grains, fineness 900, per dollar, or its equivalent in value, at the option of the creditor; and all contracts created after its enactment would be payable in silver at the rate of 371.25 grains of pure silver per dollar, or its equivalent in value, at the option of the creditor.

All who favor the free coinage of silver under the impression that such an enactment will permit them to pay obligations with silver, that are expressed in the money of account of which one dollar is the unit of accounting, and 25.8 grains, fineness 900, of gold is the measure of the value of the unit, are mistaken. They will be required to pay their gold obligations in gold and their silver obligations in silver.
If they desire to do so they may now make obligations payable in silver at the rate of 371.25 grains of pure silver per dollar. There is no law prohibiting such a contract.

All who suppose there is no law requiring the payment of all public and private obligations, expressed in the money of account, and contracted since February 12, 1873, in gold at the rate of 25.8 grains, fineness 900, per dollar, or its equivalent in value, at the option of the creditor, are mistaken. The only advantage to be gained by writing the words “payable in gold coin” in any such public or private obligation is the ease with which such a specification will satisfy the minds of those not well informed. Its presence or absence, or the omission of the word “coin” altogether, has no power to change the fact that under the law an obligation expressed in the money of account is payable in gold at the rate of 25.8 grains, fineness 900, per dollar. Congress has no constitutional power to impair contracts by legislative action.

THE ANSWER TO THE QUESTION.

One dollar is the unit of the money of account, act of April 2, 1792. Its value is 25.8 grains, fineness 900, of gold, act of February 12, 1873.

Until these laws are changed, this statement will be the only correct answer to the question “What is a dollar?”—American Grocer.

PERSEVERANCE AND PATIENCE THE ONLY ROAD TO SUCCESS.

Patience is Nature’s motto. She works ages to bring a flower to perfection. What will she not do for the greatest of her creation? Ages and æons are nothing to her; out of them she has been carving her great statue, a perfect man.

What the age wants is men who have the nerve and the grit to work and wait, whether the world applaud or hiss. It wants a Bancroft, who can spend twenty-six years on the “History of the United States”; a Noah Webster, who can devote thirty-six years to a dictionary; a Gibbon, who can plod for twenty years on the “Decline and Fall of the Roman Empire”; a Mirabeau, who can struggle on for forty years before he has a chance to show his vast reserve, destined to
shake an empire; a Farragut, a Von Moltke, who have the persistence to work and wait for half a century for their first great opportunities; a Garfield, burning his lamp fifteen minutes later than a rival student in his academy; a Grant, fighting on in heroic silence when denounced by his brother generals and politicians everywhere; a Field's untiring perseverance, spending years and a fortune laying a cable when all the world called him a fool; a Michael Angelo, working seven long years decorating the Sistine Chapel with his matchless "Creation" and the "Last Judgment," refusing all remuneration therefor, lest his pencil might catch the taint of avarice; a Titian, spending seven years on the "Last Supper"; a Stepheuason, working fifteen years on a locomotive; a Watt, twenty years on a condensing engine; a Lady Franklin, working incessantly for twelve long years to rescue her husband from the polar seas; a Thurlow Weed, walking two miles through the snow with rags tied around his feet for shoes, to borrow the "History of the French Revolution," and eagerly devouring it before the sap-bush fire; a Milton, elaborating "Paradise Lost" in a world he could not see and selling it £15; a Thackeray, struggling on cheerfully after his "Vanity Fair" was refused by a dozen publishers; a Balzac, toiling and waiting in a lonely garret, whom neither poverty, debt nor hunger could discourage or intimidate; not daunted by privation, nor hindered by discouragements. It wants men who can work and wait.

When a young lawyer Daniel Webster once looked in vain through all the law libraries near him, and then ordered, at an expense of $50, the necessary books, to obtain authorities and precedents in a case in which his client was a poor blacksmith. He won his cause, but, on account of the poverty of his client, only charged $15, thus losing heavily on the books bought, to say nothing of his time. Years after, as he was passing through New York City, he was consulted by Aaron Burr on an important but puzzling case then pending before the Supreme Court. He saw in a moment that it was just like the blacksmith's case, an intricate question of title, which he had solved so thoroughly that it was to him now as simple as the multiplication table. Going back to the time of Charles II, he gave the law and precedents involved, with
such readiness and accuracy of sequence that Burr asked in great surprise if he had been consulted before in the case. "Most certainly not," he replied; "I never heard of your case till this evening." "Very well," said Burr, "proceed." And when he had finished Webster received a fee that paid him liberally for all the time and trouble he had spent for his early.—"Architects of Fate."

STEEL TRACK HIGHWAYS.

We have received advanced sheets of "Handbook of Steel Track Highways, published by the O'Donnell Steel Tract Highway Company, 143 Chambers street, New York. Hon. John O'Donnell, late State Senator and State Railroad Commissioner, obtained a patent last November, and is the General Manager of the company. The steel track is described as follows:

"The track is five inches wide on the bottom, with half inch raised sides made of half-inch steel. It is laid on a longitudinal timber resting on ties. The middle between the tracks is filled in with stone and rounded up, the water running into the tracks and to the sides of the road by conduits from the steel track. The great difficulty in all road construction has been to take care of the rainfall on the road. If the water penetrates the crust of the road, the frost inevitably follows and the road is ruined. This gutter track takes care of the water perfectly."

The cost of this road, it is claimed, is less than a good Macadam; the reason of this, notwithstanding it is in fact a Macadam road with steel wagon tracks, is explained at length. If all the advantages claimed by the company prove true—and the reasons advanced seem well grounded—the steel track highway system will mark a new era. No invention since the steam age will so generally affect inland commerce and freight and transportation as this steel track highway. It means a revolution in the mode of business. It will be an active competitor with railroads in moving slow freight, for a horse will draw twenty times as much on a steel track as on a dirt road.

The cost of the steel track all ready to lay is $1,500 per mile. To this must be added the cost of ties, a longitudinal track timber, and the filling in of the track.—American Grocer.