

THE  
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PLANTERS' LABOR AND SUPPLY COMPANY,  
OF THE HAWAIIAN ISLANDS.

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The latest quotation of Cuban Centrifugals in New York was 5½ cents. Trust certificates, 68 and 70.

The Hakalau Plantation, on Hawaii, promises an outcome of about 6,000 tons for this year.

The Kealia Mill on Kauai (diffusion) is turning out 900 sacks of sugar, or over sixty tons, a day.

Paia and Hamakuapoko mills are turning out about 800 tons of sugar per month at each mill, both being driven to their full capacity. The cane is splendid and juice tests well.

The Ewa plantation, twelve miles from the city has now about 750 acres of cane growing, with abundance of artesian water to irrigate the fields. This cane will commence maturing about December, 1891.

The Hilo Sugar Mill commenced grinding on the first of the year, running night and day. The average output for each 24 hours has been 40 tons. The mill is 26"x54". The crop for this season is estimated at 5,500 tons, being an increase over that for 1890.

A correspondent on one of the plantations notices the custom which some of the planters are establishing, of giving sub-

stantial presents to their employees at New Years. This is worthy of imitation and must necessarily be accompanied with good results, in more ways than one.

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Rapid progress is reported on the work of bringing the water from the Hanapepe river on to the Makaweli Plantation, Kauai, and the planting and irrigation will commence as early as it is deemed best to insure a full growth of the cane. Those who have visited the place, say it is the finest piece of hydraulic engineering ever undertaken in these islands, and the supply of water is unlimited. The prospects for heavy and reliable crops are very promising.

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The Hutchinson Sugar Plantation at Kau has just completed a railroad, 36 inches gauge, from Honuapo to a point about two and a half miles below Naalehu Mill, and a Baldwin locomotive, lately sent up, is in successful operation. This railroad was constructed to take off some four hundred acres of cane, which could not have been conveyed to the mill in any other way, but it will be employed also to carry the sugar from the Naalehu Mill to the Honuapo landing. The railroad is about four and a half miles in length, the grade at the start being  $3\frac{1}{2}$  feet, which was necessary to ascend the steep hills above Honuapo.

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### *BET SUGAR IN CALIFORNIA.*

California is soon to have its third large and successful beet factory in operation. Advices from Southern California fully confirm the newspaper reports that the Chino, San Bernadino County, wealthy farmer and capitalist Richard Gird has decided to engage largely in this new venture, and has closed a contract with the Oxnard Beet Sugar Company, which commands unlimited capital. Under this contract the company engage to build a first class sugar factory and refinery, equipped with the best machinery that can be had in Europe, and with the latest improvements. Its capacity will be such that 1000 tons of beets can be worked up daily.

Mr. Gird, on his part, has entered into a contract to plant and cultivate 2,500 acres of beets the first year, and not less

than 5,000 acres each subsequent year. For this purpose, he will employ from 400 to 500 laborers. No one but a man of great enterprise, experience and means would undertake such a gigantic project as this, which, if successfully developed, will turn out each year, after the first, from ten to twelve thousand tons of refined sugar. But Mr. Gird is fully equal to the great undertaking which he has entered on.

The preliminary work has already been begun, and the factory is to be completed early in the fall of the present year, in time to take off the first crop of beets.

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### *WITH OUR READERS.*

A subject rarely treated of will be found on page 9, showing the changes which take place in the vegetable world by migration to foreign countries. The writer's experience relates chiefly to the United States, and the subject is by no means exhausted by him even there. We should like very much to see this same topic discussed in its application to these islands, where many of the trees and plants met with are exotics, which have been improved by the change.

The success which has attended the efforts of Messrs. Harrison and Bovell in Barbados has attracted the attention of horticulturists in every part of the world. The fact has been demonstrated that sugar cane bears seeds, and that these seeds if properly cared for will produce new varieties, is a great step gained in the effort to improve cane. We may yet see Mr. Lubbock's ideal of a cane stock fifteen feet high, as thick as one's thigh, and turning out 20 per cent of its weight in sugar. (See pages 18 to 23.)

An admirable article on labor is that found on page 24, in which the writer maintains that much of the cry about scarcity of labor is nonsense; that there is often an abundance of laborers, if employers only knew how to utilize them, and made suitable efforts to retain them. Every employer of laborers can learn something from a perusal of it.

Those interested in curious trees, grown in various countries, will find information not often obtained, on page 31 and following pages. The travelers' tree, which is now quite abundant in our city, is from Madagascar.

Another of the interesting series of articles on Science Teaching, to which we have before called the attention of our readers, will be found on page 40. It is full of meat, and clothed in clear, expressive and rich language, which is a pleasure to read. "Science teaches us," the author says, "how to supply these wants—how to examine everything critically, and to turn it to some use; her single aim is, that none of the Creator's gifts to man be wasted, not even the crumbs."

An account of the Louisiana Sugar Company's large refinery at New Orleans closes the series of interesting articles in this issue. The establishment can on a push turn out a million pounds of refined sugar each day, though the average output is only 900,000 pounds.

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### CANE VERSUS BEET SUGAR.

In the November issue of the PLANTERS' MONTHLY, we spoke of the relative value of these two kinds of sugar, and gave the opinion of Mr. N. Lubbock of London, England, in favor of cane sugar. The *Chicago Bakers' Helper*, which by the way is one of the most wide-awake and progressive monthlies on our exchange list, in order to ascertain the opinion of men and firms supposed to be posted in the relative value of sugars, addressed a circular to forty or more on this subject. The replies which are published differ very widely in the views expressed, most of the writers stating that they knew very little from experience about beet sugar.

The statement made by us was not that beet sugar is in any way injurious to health, but that "it has not the sweetening strength of cane sugar." If this be so, then it is not as economical for use as food, or for fruit packing, and other trade purposes, as cane sugar. In all other respects it is probably just as good as cane sugar. It may polarize as high as cane sugar, for the polariscope is a test of purity, not of strength, or crystalizing quality, or economical value. In practical use only can its value be thoroughly tested. As pure beet sugar has not been used to any extent in America, and consequently few there are familiar with it, the better

way to ascertain its value as compared with cane sugar, is to seek information from some other country, say from England, where beet and cane sugars have been in constant use for thirty years.

Now if the *Bakers' Helper* will address its circulars to a few of the leading confectioners, fruit packers and hotel keepers of England, and obtain a consensus of their opinion it will be more reliable and to the point. Or let the experiment be made in two or three places in Chicago, each using a barrel of pure beet sugar and then a barrel of pure cane sugar of the same grade, for food, confectionary or fruit packing purposes, and the result ought to indicate the relative value of each. "The proof of the pudding is in the eating."

There can be no doubt that beet sugar is just as healthy and for most purposes just as good as cane sugar. No one will rejoice more at the success of the beet sugar industry in the United States than we. If it proves so successful as to supply the wants of the entire population, it will be a saving to the nation of two hundred millions of dollars annually. But it will probably require at least one tenth more beet sugar than cane sugar to supply its wants.

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### *PROPOSED SUGAR REFINERY ON PUGET SOUND.*

Advices received here, during the past year from Seattle, Wash., refer to the project of establishing a sugar refinery at that place as likely soon to be developed, in connection with cane sugar from these islands and sugar beets to be cultivated in that section. We have not put much confidence in the reports, inasmuch as most of our planters are under contract to deliver all their crops either to the American or California refinery in San Francisco, for two or three years longer. Whether the abolition of the sugar tariff on refinery grades will result in a virtual cancellation of these contracts, so far as they apply to the American refinery remains to be seen. Still, the following extract from one of the Seattle papers is of interest: Mr. F. Ward, cashier of the Seattle National Bank, is pushing the scheme of establishing a sugar refinery at this place. He proposes that the local capitalists raise \$200,000 for the enterprise. Hawaiian capitalists will contri-

bute another \$200,000, and Mr. Ward will guarantee another \$200,000 from other sources. The idea is to operate in connection with the American sugar refinery of San Francisco. Recently Hon. A. P. Carter, the Hawaiian Minister at Washington City, was in Seattle, and expressed a willingness to put money into a sugar refinery here; and other Honolulu planters, Mr. Carter believes, will subscribe heavily. It will take several months to get the organization properly perfected, and to put it in operation. By that time our transcontinental railway lines will be completed to Seattle, and in position to handle the business. Seattle offers better facilities than San Francisco, on account of short hauls. Mr. Ward has a large sum pledged.

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### *DISCOVERY IN SUGAR MAKING.*

A statement has recently been published that the experimental chemists of the Agricultural Department at Washington have made a valuable discovery relative to the use of alcohol in producing rapid precipitation in cane juice. To say the least the discovery is a very novel one, and was made in connection with sorghum sugar experiments. But if it proves to be of the value claimed for it with sorghum juice, it may be equally so with cane or beet juice. We give the main facts as they are published:—"The annual report of the chief of the chemical division of the Agricultural Department contains an account of a process recently filed at the Department of the result of experiments in the chemical laboratory with reference to the manufacture of sugar. The report of the chemist gives some of the various difficulties heretofore found in the economic manufacture of sugar from sorghum and indicates that the solution of the question will be found in some process which will separate as nearly as possible the gummy bodies from juice without precipitating the sugar. The known property of alcohol to produce precipitation in juice was made use of.

"In the further study of this problem not only has the removal of the cells been effected by a process evolved during these experiments but it has been shown that this can be effected at a cost comparatively trifling.

“By subsequent distillation another feature is ascertained that the gummy substance, separated by the process, is itself valuable, yielding almost half its weight in alcohol. In order that the new method may become feasible, the report suggests the necessity for a modification of the revenue laws, so as to allow the preparation of alcohol used in the process to be carried on without tax, to be made under bond by the manufacturer that it will be used only for this purpose.

“The chemist claims substantially an increase in yield of sugar per 1000 gallons of juice from an average of about 10,000 pounds to an average of over 21,997, at an increased cost of production of \$34 for the alcohol which enters into the new process.

“According to their figures, and estimating sugar at four cents per pound, we have a gain in profit of \$395, which is nominally ten per cent increase per thousand gallons of juice.”

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### VALUABLE SUGAR-HOUSE STATISTICS.

SPRECKELSVILLE, January, 1891.

EDITOR PLANTERS' MONTHLY.

The following figures are convenient and useful, and although not altogether original, the greater portion is derived from my own investigation.

Yours truly,

H. MORRISON.

1st. I find from an average of many samples that a fibre determination of our cane can be reduced to the following rule:

Multiply the proportion without joint knots by 11 per cent., and the proportion with joint knots by  $16\frac{1}{2}$  per cent., allowing  $\frac{3}{4}$  inch for each knot.

The figures will give a nearer approximation than a few very accurate average analyses:

EXAMPLE:—96 inch cane has, say 20 knots,

$96 - 20 \times \frac{3}{4} = 81$  inches = 84.4 per cent. of the whole cane,

$20 \times \frac{3}{4} = 15$  inches = 15.6 per cent. of the whole cane,

So  $84.4 \times 11$  per cent. = 9.28 }  
 $15.6 \times 16\frac{1}{2}$  per cent. = 2.57 } 11.85 per cent. fibre.

The nearer the knots are to each other so much the more fibre, and the longer the joints the less fibre.

2d. Extraction is frequently desired where it is impossible to measure the juice, but where the cane and bagasse are weighed, the fibre given, the normal brix from the three rolls and the diluted juice from the auxilliary rolls recorded, the the following is near enough for practical work :

EXAMPLE:—100 tons Cane, Fibre 12 per cent., Normal Juice Brix 20, Dilute Juice from 2 Rolls, 5 Brix, Bagasse 25 tons ;

$$100 - 12 = 88 \text{ per cent. juice in Cane,}$$

$$88 \times 20 = 17.60 \text{ solids in juice,}$$

$$25 - 12 = \text{dilute juice in Bagasse,}$$

$$13 \times .05 = .65 \text{ lost solids in Bagasse,}$$

$$17.60 - .65 = 16.95 \text{ or } 96.3 \text{ per cent. of } 17.60,$$

So  $100 : 96.3 :: 88 = 84.7$  per cent. the extraction in terms of Cane.

Comparisons between milling and diffusion ought to be rendered as above in percentage of juice extraction.

3d. Dilution and Evaporation should be rendered on the normal juice as under :

Normal Juice Brix 20, Dilute Brix 14, dilution is  $\frac{20-14}{14} \times 100 = 42.9$  per cent., or for every 100 lbs. Normal Juice we have added 42.9 lbs. of water.

Evaporation from, say Brix 18, to Brix 39, is  $39 - 18 = \frac{21}{18} \times 100 = 53.8$  per cent.

The application of so simple a calculation would sometimes prevent exaggerated reports of what is being done in dilution without additional fuel.

4th. Tracing the juice through the boiling-house, it appears that very little inversion is apparent until it is depositing crystal in the vacuum pan, juice entering the vacuum pan should be slightly alkaline, litmus-paper is the most frequent indicator, but phenol-phthalien is better for the purpose at this stage.

The following is useful :

$$\text{Baume to Brix } \times \frac{5}{9}. \quad \text{Brix to Baume } \frac{5}{9}$$

$$\text{Brix to Spec. Gravity } \frac{259}{5} = \text{given Brix.} \quad \text{S. G. to Brix } \frac{259}{5} = \text{S. G.}$$

$$\text{Baume to Spec. Gravity } \frac{144}{5} = \text{given Baume.} \quad \text{S. G. to Baume } \frac{144}{5} = \text{S. G.}$$

Specific Gravity to weight in lbs. per Imperial Gallon, remove decimal point one figure to right.

## CORRESPONDENCE AND SELECTIONS.

*EFFECTS OF CLIMATE ON VEGETATION.*

BY E. P. POWELL.

Some years ago I moved from New York State to Michigan, on a line with the lower tier of our counties. It cost me many dollars and much vexation before I learned that a tree set out without thorough mulching under the clear, western skies, would suffer far more speedily and seriously than at my old home. Fuchias that bed out well here, become in a short time sticks; seeds that I had been accustomed to germinate in the open soil must there be started in frames. I soon saw why Michigan forests were not the same as New York forests. The changes there favor large seeded sorts, such as oaks, walnut, hickory. My first year's garden was a fair copy of the Sudan desert. I had, however, an arbor, where I could sit and study the effect of the climate on vegetation.

English gardeners transferred to Colorado invariably become disgusted. Coming from an atmosphere saturated with moisture, they find the air desiccated, their plants cooked, and their trees shriveled. It is one of the lessons least often anticipated that in removing from section to section we have to learn new rules of agriculture and a new pomology, as well as new floriculture at every removal. This is more than most immigrants will do, and they are therefore failures. Many things must be considered in migrating. Those who have lived in a limestone section till middle life rarely are successful or happy or healthy in the bottom lands of Western rivers.

In Baltimore peaches are at home; in San Francisco they are not. But just over the Bay in Oakland you find more of Baltimore than of San Francisco. Climate is the relation which living things bear to the temperature, motion and humidity of the atmosphere. There is no such thing as a climate for any large district. In Michigan, Mr. Beals, living six miles from me, rarely if ever missed a superb peach crop, while my own trees and those about me gave a crop once in

three years on the average. In the town where I reside at present, it is easy to pick out several climatic tendencies within five miles square. I can ripen grapes in a southeast faced swale, while a mile or half a mile even away, spring and early fall frosts are sure to be encountered. But on the average this town is ten days earlier in spring development than the town south of us. These local climates are of immense importance to one intending to live by fruit growing. I said to a farmer living over the West Hills, "Why do you plant strawberries? I get mine into market and all sold before you can ripen a quart." "Exactly so," he answered; "and then I come into market just in time to follow you." He had made his calculations correctly. Snowbanks cover his farm when mine is green and growing; but he knew how to adjust himself to climate. Some one else nearly as early for market as myself, will catch neither the early nor the late demand. As a rule, a southeast exposure is the best, protected by hills to the west or north, if one needs early warmth and safety from frosts. It may make all the difference between success and failure. The study of soils is, therefore, only one item in localizing; the local climate must also be known.

But we have a long list of facts not to be accounted for on any known principle. The European grape-vines refuse to become acclimatized in equally warm zones of America. Many Asiatic plants decline to adapt themselves to climatic influences, although absolutely hardy in their native habitat. American trees like Australia. Large exportations have gone there of our tulip tree, Kentucky coffee tree, etc. The trees of Japan show a special fondness for the American climate. It is not a matter of soil, or of cold and heat alone. Climate includes the matter of moisture, of winds, of predominance of clouds or clear sky, and the presence of elements held always more or less in the atmosphere.

Our native swamp trees and plants, including even the bulbous roots, thrive better when transferred to drier places. All water plants, except the absolutely aquatic that root under water, grow better on higher soil. These include blue flag, weeping willow, red maple, cardinal lobelia, and dicentia. Why these should be found mainly in swamps is probably

owing to the struggle for existence. Sturdier growths crowd them down and out of healthier spots ; and only those survive that can endure the marsh land and marsh climate. The tyrannical elms and maples cannot. Man interferes, and the weaker sorts are enabled to find more congenial locations. On a broader scale man interferes with locality and enables plants to enlarge their adaptations and develop possibilities. The rose, wild, is confined to the Northern hemisphere ; while most of our bulbs come from Southern Africa, and trees with vertical foliage belong almost exclusively to Australia. But all these have been transferred, and in some cases the species have been much ennobled by a change of climate. The primitive home of the *Brassica* is the marshy seacoast ; but we have given it a footing in our gardens, and let out the three imprisoned princes, brocoli, cauliflower and cabbage. This is not the result of soil so much as climate, for the *Brassica* still loves nothing so much as to be fed its old diet of salt. Then we have a long array of facts like these : trees from cold climates are more capable of enduring extreme heat than sub-tropical trees ; that is, you must pass over one or two belts and take trees of a cooler zone if you wish to acclimatize them to the tropics.

The effect of climate is equally marked on hardness, on form, on stature, on fecundity, on time of maturity of seed. Comparing those grown on the same isothermal line we find *Magnolia gracilis* in its native home twenty to thirty feet ; but in our country, as well as in England, it is never more than a bush of six feet. As to fecundity, Downing states that some strawberries that are pistillate in England become staminate in this country. Climate changes the sexual balance of the plants. In addition most of such varieties are otherwise worthless here. The cucumber is said by Dibble to become seedless in some of the Pacific Islands—a most desirable change of habit for our own climate if it could be secured. The periodicity of plants is often changed in all respects. The *Ricinus* is in Africa a perennial, in Europe a biennial, in this country strictly an annual. Our hot, dry atmosphere hastens its maturity, and leaves in autumn too little vitality to endure the dry, cold winter. No plant is in reality, therefore, strictly annual except as being able to go through a functional

development inside a year. In California the beet grows continuously for eighteen months. Darwin tells us the two plants most capable of modification by climate are corn and wheat. In three years spring wheat can be changed to winter wheat ; or conversely.

Climate not only brings out new properties, but increases or depresses old ones. The proportion of gluten in wheat differs in different countries. A French experimenter sowed, near Paris, fifty-four varieties obtained from the South, of which fifty-two sorts gave heavier seed ; but sent back to their native lands they reverted to their own standard. Much of this was doubtless due to soil. Indian corn or maize reverts in six years, in Germany, to a European type entirely unlike anything in this country.

One of our most important problems just now is to secure fruits suited to extreme cold such as prevails in Minnesota ; to produce modifications of peaches suitable for several parallels north of where they can now be relied on for annual crops ; and other fruit in like manner. The Siberian and Russian fruits are doing much to help us ; they are themselves the result of long adjustment to cold environments. A good deal more attention should be paid in purchasing trees to the relative climate of the nursery where they are grown. In a northern nursery cold is constantly eliminating the more tender stock, leaving only those of tougher fiber. On the contrary, in a southern nursery heat is eliminating those most liable to injury from heat. Local climates produce several distinct effects ; but these are the facts. It follows that peach trees, even of one variety, are not equally hardy in different sections, because the trees are not when young subjected to the same process of thinning by the climate. The general law is of course to buy from nurseries not far from our own line of latitude.

Natural selection in the vegetable world looks very little to quality, but to endurance and virility—in general to health and vitality. The tree that can endure the severest changes of weather and produce the largest amount of seed may be said to be selected by natural law. It stands the best chance of survival both as an individual and as a race. Occasionally, this is coincident with quality of the highest sort. Among

millions of harsh and thorny sorts there came our wild Seckel.

Nature's ideal was attained at Monroe, Michigan, in the old pear trees over seventy feet high and two hundred years old—the fruit as tough as the tree. Man's work, looking to preservation of quality, and overlooking endurance, produces invariably a tendency to lessened vitality, and always to a decrease of fruit and seed.

The Northern Spy gives one apple to a whole bunch of wild crabs; but it is huge in size and delicious in quality. We have been following the road of weakening our stock of orchard trees for a century, with great speed. We will be compelled to turn our attention sharply to selection for the sake of health and hardiness. This is again notably true of the grape. Nature hangs our fences and trees with frost-proof vines and frost-helped fruit, to the disgust, after all, of foxes and men. Man, in reversing the result as to quality, finds great difficulty in securing hardiness. Nearly all the ground-work of Ricketts and Rogers and Grant and Arnold has ended in enfeeblement.

The attention of our shrewdest cultivators has been turned to this point, and some notable results already follow. I notice from my window at this moment the catalpas and altheas that have survived the test and are parents of hardier stock. In my orchard I see, also, that while most of the nursery stock has been eliminated, a few varieties have been selected here and there over the country, and are gathered now as proof against the severest cold. In striving to produce hardier races of such trees as peaches and fruit trees in general, we are, however, met by the fact that while the flower itself is hardier than the leaf, if touched by frost, the flower buds are less hardy than leaf buds. Flowers are recognized as metamorphosed leaves; and in the morphological progress from leaf to petal there is some increase of hardiness; but the foldings of the large round flower-buds in winter do not save the germ inside as surely as in the case of the sharp, solid, leaf-in-folding buds. These preliminary remarks are written mainly to prepare the way for a discussion of man's power to work with climate in modifying vegetation—a discussion which must be deferred to a succeeding article.

A direct line from the Equator to the Poles would give us the result of Nature's successive evolutionary changes. At the Equators palms, bananas, mimosas, philodendrons, and a vast show of magnificent climbers, together with the marvelously imitative orchids. Next we enter a zone of evergreen woods, in which will be found the citron family, including oranges and lemons and grape-fruit. Beyond this occurs the belt of deciduous trees where we have our home, covering the whole of the United States. Here are nut berries and the fruits of the Rose family, including apples, pears, plums, cherries, peaches, and the most common berries. Next there is a belt of conifers, including firs, larches, pines and spruces, all having needle-leaves. Lastly, a ring of birches terminates with a northern fringe of willow bushes, that are themselves edged with mosses and red-algæ. Another line taken from the surface of the earth toward the center and passing through the geological strata of successive periods, gives us results almost identical. In the Tertiary formations are the deciduous forests. In the Secondary rocks are the pines. In the Primary rocks are the flowerless plants. In the Primordial only seaweeds occur. This is the vegetable kingdom that man enters, and to modify which is a matter of vital importance. He has already worked some marvels; but he is sure to work greater. We shall some day have control of the vegetable kingdom, indicating our supremacy more complete than in the animal kingdom. It is not impossible that climate itself will be found to be so largely subject to human control that we shall be able to vastly enlarge the boundaries of vegetation and the limits of those now narrow belts devoted to the culture of edible products and human sustenance. It is not the arid plains only, but the snow-fields, robbing us of tens of millions of square miles of land that we have yet to consider. We must learn to transmute the phosphates and other food elements of the rocks directly into food; and we must more than double the habitable parts of the globe. In another article I will discuss some of the means that we already have at hand for modifying climatic influences for our own advantage.—*Independent*.

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*RAMIE CULTURE.*

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Notwithstanding the immense success that has attended the experiments in every branch of horticulture that have been made in this State it is manifestly impossible that the whole vast area of California should be devoted to fruit growing and that every tiller of the soil should engage in some branch of that industry. It must inevitably be that there will always exist a large class of husbandmen who will desire to engage in other pursuits than the care of the orchard and vineyard. At present there are practically but two openings for profit outside of horticulture. These are the production of cereals and the raising of stock of various kinds. Every year wheat growing becomes less profitable for the small farmer—which in this sense means the owner of 320 acres or less. The introduction of steam into all the operations of the grain field has, as is now quite well known, so reduced the cost of production upon large areas as to practically crowd the small grower out of the market.

The last Congress was asked by the Secretary of Agriculture to make an appropriation of \$100,000 to pursue investigations in this direction, and it behooves California farmers to be alive to the importance of the results of that investigation. Experiments made under the auspices of the State University as well as individually in various localities on the coast show that the valley lands of the entire State are admirably adapted to the production of the ramie plant. Irrigation will be needed in the more arid regions, while in those localities where the natural rainfall is sufficient for ordinary crops ramie will need no artificial supply of moisture. Practically speaking there is no part of the State where the plant may not be successfully grown.

But first a word for the uninformed as to the uses of the ramie plant. It belongs to the nettle family, and for ages has been cultivated in China, Japan and India, where the fiber is treated by hand and used for the manufacture of a great variety of fabrics, from the coarsest to the finest. In Europe ramie fiber is utilized for the manufacture of almost every species of textile fabric, the results produced being in the highest degree satisfactory. It is mixed sometimes with

cotton, wool or silk, and the fabrics thus produced are handsome, durable and valuable. Experiments have also been made in this country, with most promising results, and for the last thirty-five years the question of introducing the cultivation of this plant into America has been discussed.

The one obstacle, however, has been the difficulty of providing machinery for the separation and cleansing of the fiber from the vegetable substance and gum in which it is produced. Decortication, as it is called, must be done by machinery in order to be successful in this country. In China and Japan it is done by hand, the immense supply of cheap labor obtainable in those countries enabling the production of the fiber at a profit, even though the price for the finished product be low. Many attempts have been made to construct machinery that would perform the task of decortication both rapidly and perfectly, and therefore cheaply, and it must be confessed that the majority of these experiments have been lamentable failures. Like the separation of cotton seed from the fiber, however, it is manifest that perfect decortication by machinery is not a mechanical impossibility, and that American ingenuity must certainly be equal to the task of solving the problem. That ingenuity has conquered every difficulty with which it has thus far been confronted, and just as American (Californian) skill has met the Indian ryot in the grain field and beaten him in the cheapness with which wheat can be produced, so is it certain that the ramie fiber maker of China and Japan will yet find the product of his handiwork surpassed in cheapness and in quality by the machinery of this country.

From what can be learned the problem of decortication and manufacture of goods from American grown ramie appears to be near solution. Factories have recently been established at New Orleans and at Mobile, where some new ideas in machinery are being elaborated by which it is confidently believed the difficulties heretofore experienced will be solved. It is claimed that experiments made with this machinery have been eminently successful, while the Government has extended its aid in bringing them to trial on a large scale.

It is proposed to inaugurate the experiment on the Pacific coast as well, and parties are already making preparations

with that end in view. From what is positively known of the value of the ramie plant and its fiber it is evident that if these latest efforts prove successful, California farmers will have opened to them an avenue for profit that will be of the greatest value. By utilizing the idle water power that is to be found in many localities it will be possible to produce and manufacture the ramie in the same spot, thus reducing the expense to the lowest possible amount. The employment of large numbers of hands in such establishments will besides create a home market for many farm products, such as butter, cheese, eggs, poultry, vegetables, etc., so that the benefits from the establishment of such an industry will be both numerous and widespread.

From the actual growing of the ramie itself there is a good profit to be realized. In a climate like that of California three or four crops of the stalks can be cut each season from the plants, which are perennial, and are planted in rows just far enough apart to allow of cultivation. At the low price of 6 cents a pound for the fiber it is calculated that there is easily a net profit of \$120 an acre in the cultivation of the plant. But the new process to be followed in New Orleans and Mobile produces a fiber of the finest quality, and of at least 50 per cent greater value than the ordinary material, which would increase the profit to the producer accordingly. This estimate is based upon results obtained in France and England, where the cost of cultivation is considerably lower than it would be in California, and it is the outcome of calculations made upon the most conservative basis.

It is evident, therefore, that the introduction of successful decorticating machinery into this State will enable many farmers to engage in an industry which promises far better returns than almost anything outside of horticulture. The progress of the experiments now under way will be watched with great interest by all who are solicitous for the welfare and progress of the State, since their success means an addition to the already wide range of industries pursued here.—*S. F. Chronicle.*

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Planting right, means, in the first place, locality, soil and climate adapted to the variety of fruit to be planted.

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*SEEDLING SUGAR CANE.*

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The systematic propagation of the sugar cane from seed is as yet in its infancy, nevertheless some facts of interest and importance have been discovered which are worth briefly summarising here. Since the time that the rediscovery at Dodd's Botanical Station, Barbados, of the seminal fertility of the cane was authenticated, realizing its potential importance, systematic experimental work has been carried on at our own Botanic Gardens, as our columns have before disclosed. That the very earliest varieties of sugar cane can reach maturity the first year of their growth from seed has been shown as possible under favorable circumstances this season at the Botanic Gardens; though, it must be admitted, that even with these very earliest varieties, both the proportion of canes in a stool and of plants to a bed of the same variety which flower the first year is small. Seed of the variety *Karakarawa*, which is one of the two earliest kinds in the colony, was sown on the 1st October last year. Three months later the young plants were taken from the seed boxes and pricked out in baskets, five or six in each basket. Six weeks later again they were shifted on singly into large baskets, which were about six inches deep and wide, and in which they remained till they were from one to one and half feet high, when, on the 19th of April last, they were planted out in the open ground. At that time each plant consisted of a solitary shoot, none having begun to sprout from the base. A few weeks later, however, they began to tiller freely, and to grow rapidly, and by the middle of September a few shoots of the more advanced plants were in flower; thus completing the cycle of growth. As, when they were planted out in the ground, in April, the young plants were only in an equivalent stage to that of a cane top, put into the ground at the same time, the record above given shows that seedling sugar canes of the earlier varieties make rapid and vigorous growth once they get past the tedious period of infancy, which occupies from four to six months. Only, however, the very earliest varieties mature the first year; all the rest, though they may be only a month or so later in their period of flowering, miss the first season of arrowing, and con-

sequently have to go on to the following autumn before the chance of performing that function occurs again ; so that for the great majority of varieties it may be said that two years are required from the time the seed was sown for the seedlings to mature, or from fifteen to eighteen months from the time they were strong enough to be planted out in the open ground.

This is a sufficient proof, if any were needed, that the idea of resorting to seed for propagation in field agriculture is impracticable, and that the present methods of propagation by cuttings or stumps will have to be adhered to in the future as in the past, if only for economy in time. But, of course, the insuperable obstacle to using seed in field propagation, even if time could be regarded, as the Indian regards it, as of no consequence whatever, is the delicacy and slow growth of the sugar cane in infancy. In the climate of Guiana, field propagation of the cane by seed would probably not yield an average of one plant per acre. As we have emphasized before in these columns, the only useful way of employing the knowledge we now possess of the sugar cane's seminal fertility, is in nursery propagation, with the object of obtaining new varieties. Of this method of propagation and its results we have now had two seasons' experience, and short as the period is over which the experiments have extended, the information gained is highly interesting and instructive. Numerous facts, naturally of varying importance and practical interest, have been discovered, two of which are of great value because of the promise they hold out of ultimate economic improvement in the sugar cane by this method of propagation. The first of these important revelations is the wide variation that occurs in seminal generation in the sugar cane ; and the second the marked tendency to improvement shown in this variation.

As was naturally to be expected there are numerous instances of retrogression, but the general tendency is clearly on the lines of improvement in each particular variety that has been so far successfully tested. The progress in improvement is gradual of course, and the degree naturally in direct proportion and relation to the character and quality of the parent canes. The inferior varieties, for instance, do not produce large varieties in a single generation, but, as with

the better kinds, few or any of the progeny show a decided improvement on the parent stock. In the majority of instances the improvement, though evident, is not great, but occasionally an instance occurs that is a striking advance. This is the ground of encouragement in pursuing this method of reproduction. If among the seedlings of a variety is found in the first generation a plant twice or thrice the size of the parent plant, we are justified in expecting that by selecting this larger plant and breeding from it again we shall get still further improvement, to be repeated again and again in succeeding generations. This, we may note, is one of the points already achieved. By recording the name of the variety from which each lot of seed was gathered, when it was sown last year at the Botanic Gardens, this possibility of improvement has been established with certainty, so far as the evidence afforded by a few varieties in a single generation can be taken as a guide, and we know of no reason against its acceptance.

We have mentioned the occasional improvement observed in size in the seedlings of these carefully recorded parent varieties; but the variation in color and form and other external characters is more general and conspicuous than that in size. In the majority of instances there is an evident approximation in physical and morphological features to the characteristics of the parent, but the departure from this typical state covers the entire range of variation possible, from the least to the widest extreme. Of this wide range too many instances have occurred to leave any room for doubt on the ground of possible error of record as to parentage that might arise from mistakes made in gathering and sowing the seed, or in the subsequent course of growth. In many instances the variation is slight, but in several cases purely white or green canes have been produced by dark purple ones. We have said that in the majority of the seedling there is a general approximation to parental likeness, but absolute likeness does not bear a very great proportion to the whole variation. The degree of approximation varies however in the different kinds the smaller inferior canes producing a larger number like the parents than the larger and superior ones. One of the larger kinds of which many plants were raised, not one appears to

have come absolutely true. This variety, called *Mani*, is a long-jointed claret-colored cane, and the widest departure it has made in its varied-colored progeny is to a short-jointed white cane. If this instance stood alone, as we have before intimated, it might be thought that a stray seed of some other kind had got into the stock, but, as we have also before intimated, the several instances of the kind that have occurred are too many to require or to justify resort to any such explanation.

It seems not improbable in fact that if any one of the inferior varieties, possessing a fair degree of germinating power, upon which success largely depends, were taken in hand, that by seminal propagation and careful selection from the seedlings, as many varieties, showing as wide a range of size, color, quality, etc., might be procured from it in a few generations, as all the kinds of canes collected from all sugar-growing countries, which we now possess, show. This impression, gathered from our brief experience, justifies sanguine hopes of improvement in the future of the varieties we now cultivate, and imposes the obligation of zealous endeavor to realize this improvement. Another encouraging feature of seedling canes is that the features they first present appear not to be their best or permanent ones. During the first two years, at least, the period that seedlings have been under observation here, there seems to be a steady general improvement in character. Where the first shoots have been slender, subsequent ones have come double the size, and where in the earlier canes the joints have been short and often bearded, in the later ones they have been long and clean, and a higher gloss and glow have also developed in the color. So that as two full years are in most instances required for seedling canes to reach maturity, so also this period is necessary for them to develop their true character.

The inference may be taken from this that if the cultivation of the seedling canes first discovered in Barbados had been extended, the objectionable features for which they were discarded and destroyed would have disappeared; in which case we should probably not now have to lament the loss in the experimental working of this potent discovery of the thirty years which have elapsed since that time. Though we have

described the wide variation and improvement that might possibly be realized in a few years in breeding and selecting from one of the poorer varieties of cane, we have intimated as well that our object—that is obtaining an improved variety of cane to any now existing—would no doubt be earliest realized by breeding from the better kinds. The primary qualities required are—first, large size, to give weight of cane from the fields, and—second, sweetness to give yield of sugar from the canes. These may be regarded as the primary and absolutely essential qualities of a good cane, while it is admitted at the same time there are several important minor qualities, which, though dispensable, are also desirable. These pertain to the habit of growth, resistance to drought, earliness, flowering or non-flowering, degree of itch to the leaves, of fibre in the cane, etc., etc. In selecting breeding stock it must be admitted that we have much to learn on the subject of the transmission of qualities in seminal generation in the cane.

We have described to some extent the evidence we at present possess of the considerable variation that takes place in descent in the physical and morphological features of the cane; whether the sweetness will vary to the same extent sufficient time has not elapsed yet for us to determine. This character is equally as important as that of the size and physical nature of the cane, and in our experimental work demands equal attention and regard. The few analyses it has been possible yet to make seem to point to the fact that external physical variation is accompanied by internal chemical variation. But we must wait another year, till our pedigreed seedlings have matured, before we can speak with assurance on this point. However the uncertainty need not affect our present action; there can be no question, whether the saccharine quality varies or not in descent, the best stock to breed from is that possessing in largest degree the qualities, separately or combined, of weight of cane and of sugar. There are three possible ways in which we may look for improvement in the sugar cane. We may obtain a variety that will give a larger weight of cane per acre, though it may contain no more sugar per ton of cane than the better kinds we possess now. Again, we may obtain a variety yielding a higher percentage of sugar, though the weight of cane be not

increased. This is what has been accomplished in regard to the sugar beet. Thirdly, we may obtain a cane containing both increased yield of cane and of sugar. Which would be the most desirable would depend upon the degree and relative proportions of bulk and percentage of sugar in the cane.

Sufficient has been said to show what is to be sought in propagating the sugar cane from seed. We shall not get an ideal cane; but MR. NEVILLE LUBBOCK gave the writer one day a rough ideal toward which we may successfully strive. "What we want," said he, pointing to a plantain stalk fifteen feet high and as thick as one's thigh, "is a cane as big as that containing 20 per cent. of sugar." Whether we shall ever attain to the size of cane or degree of sugar contents just mentioned may be left to conjecture and the result of future work, but it is along the lines leading to those ends that we confidently look to make progress. The *Scard* seedling gives us an indication of what is possible. This is a plant of unknown parentage and fortuitous birth in Barbados. It was among the earliest natural seedlings discovered there by MESSRS. HARRISON and BOVELL. When an inch or so high, and when nothing whatever could be known of its character beyond the facts mentioned, it was taken by chance from the nursery at Dodds by MR. BOVELL and sent here. It has turned out an entirely unknown variety, and a giant of its race. A few months ago it fell down of its own weight, when ten canes were broken off which collectively weighed one 122 lbs. without the tops. In spite of this loss it is still eighteen feet high and twelve feet in girth of stool, possessing twenty-four canes which will probably weigh when cut 200 lbs., half as many more having been killed by borers,—pests that have been unusually prevalent this year. In a further issue we shall make some remarks on seed sowing this autumn.—*Demerara Argosy.*

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A horse requires one ounce a day of salt for the renovation of the digestive fluids, which are secreted in large quantities. An ox or cow needs two ounces daily, and a sheep one-quarter of an ounce. Ruminating animals require more salt, because of the large consumption of saliva during the process of rumination.

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*THE LABOR QUESTION.*

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In the labor markets of the world there exists a vast amount of discontent: a feeling of unrest undoubtedly pervades the minds of the work-people in all the great centres of industry: a cry, as yet inarticulate and indefinite, fills the air, warning men that there is something wrong in the social machinery which requires skilful and delicate manipulations to set it right. We have faith in mankind, and believe that it will all be adjusted: there is wisdom and justice enough in this world to deal with the great social questions of the day, and to harmonise and to bring back into tune all that seems now to be to discordant. In such a dispute as this, between capital and labor, it is not to be wondered at that charlatans and so-called politicians should endeavor to make capital out of the difficulties that have arisen, or that malicious knowledge should impose on the ignorance of simple working-men, and try to lead them astray from the paths of justice and truth; but despite these evil influences, it is one most hopeful sign of the times that the desire for *discussion* prevails over the tendency to *violence*. We have to thank education for this: the light has entered into the very souls of men; and although in such a great contest injustice will happen, as when trades-unions interfere with the liberty of their fellow-men, or endeavor to boycott all who do not endorse their doctrines, yet the tendency is towards discussion, and the rampant fire-brands have so far failed to light even the faintest spark of that social revolution which for selfish ends they so ardently desire. Capital and labor are so inter-related that they cannot be long divorced; the temporary disturbance we feel sure is capable of adjustment; the spirit of fair play must prevail. The great army of producers will in time settle their differences; the demagogue will most assuredly fail to uproot society, and, joining hands once more, capital and labor will resume their industrial and God-like work. The discussion will, no doubt, clear away many an error, while the feeling of a common humanity will prompt men to make life's burden light, or at all events not unnecessarily heavy. We have faith in human nature, and although the stream may become turbid for a

time, yet as it flows it frees itself from impurities : the angry passions of the day must subside, and common-sense will eradicate many an existing evil, and harmonise the relations of men on the basis of mutual inter-dependence.

Meanwhile, the contest rages ; the sound of the strife reaches us from afar, and most assuredly the annoyance and inconvenience occasioned thereby have also been our portion, for has not our English mail this very month been delayed by reason of the strike of the Southampton dockmen ? Good cause have we to be thankful that, so far, the great labor question has only succeeded in delaying our letters for a day or two, and not our bread say for a month or two, for that to us would indeed be a calamity. But *Excelsior* for the month of September says, "It is no matter for wonder if a small ripple of this huge wave of discontent has reached our shores." Has it ? when ? where ? And how ? we ask. We venture to reply that outside that circle of individuals who make a special study of English papers—omitting nothing—not even the advertisement sheet—there are not a dozen men amongst us who have given any very particular attention to the subject. The fact is, the conditions do not exist in Barbados for strikes such as those we read of as occurring in Great Britain, Australia, and America. These great centres of industry are forever holding out superior inducements to workmen of all classes and grades, who consequently flock to these points seeking employment. Plethora and stagnation of the labor market of that place or country result ; discontent spreads ; and an organized strike quickly follows, because the law of supply and demand, which would quickly solve the difficulty, is held in obedience ; for the Unionist terrorizes the non-unionist, makes a slave of him, and prevents him from working although he would gladly, if left to himself, earn his bread patiently and honestly ; such conditions we repeat do not exist in Barbados. Our special industries are peculiar to ourselves, and can be better manipulated by our own people than by foreigners ; the latter will never rush to our shores, desirous of digging cane holes, or of trying their muscle at the arduous task of cane cutting on a hot day ; nor is it likely that they will ever be emulous of carrying baskets of reeking manure on their heads ; the hungry

ones of Europe and America will never make a rush for those things ; a few may come and supervise in a gentlemanly way on horseback, but that will be all. Our population is large it is true, but none of the conditions exist here which occasion strikes elsewhere ; although redundant there is absolutely no congestion ; the complaint seems to be all the other way. A leading planter actually bemoans the loss of several hogsheads of sugar "*owing to the scarcity of labor.*" This scarcity, it is true, may be due to the fact that people will not work ; but everyone acquainted with the country districts and the habits of the people, knows very well that during crop time every man, woman, and child capable of carrying and *sucking* sugar cane, is, in some way or other, engaged in reaping operations. Every country house-holder, not on a plantation, finds out that he must put off his extra jobs until crop is over : and the small proprietor without a mill, or enticing boiling-house, must perforce allow his land to run to grass until the reapers have finished reaping, when he knows they will come readily enough to work for him. As a matter of fact all the available hands of the country districts, and many more from Bridgetown, participate *willingly* and *readily* in the work of sugar-making every year ; of the 44,000 available laborers in the island we would venture to affirm that not one willingly absented himself or herself from participation in recent reaping operations. Evidently then there is no unwillingness to work, no inclination to strike on the part of our industrial army of 44,000, who if they did not quite do their very best to reap an extraordinary large crop, at all events did reap it, and in fairly good time too. It is very true "many planters have been heard to say that if they had been able to secure labor as they wanted it, their output of sugar would have been much greater." Most assuredly the power to contract or expand a labor-market *at will* would result in an increased output of sugar and of many things besides, more or less profitable. The fact is, during the crop season there is a special demand for labor ; out of crop, as our beautifully cultivated fields testify, the 44,000 are enough, and more than enough, for the ordinary and regular agricultural operations of our Island ; but when the reaping begins, and the large steam mills, which every year increase in number, begin to grind,

then naturally enough *extra hands* are required, and planters feel sore when they cannot get them to order, and lose in consequence a few hogsheads of sugar, all unmindful of the time, not long since past, when the "planting out" of the laborer and forcing him to remove to some village near by, or some tenantry near town, was considered a fine stroke of management, against which the *Planters' Journal* was *not* to protest. Our cotem asks, "What then is the cause of this want in our labor-market of which we have lately heard so much?" And immediately, without wetting his feet in "the small ripple of the huge wave," answers the question for us in the very words of those "who point to the disease," for they tell us that it (scarcity of agricultural labor) *is not chronic*,—that it is chiefly or only in the reaping season, or at the time when some forced special work is to be done, that the want of agricultural labor is felt."

Surely this can hardly be called a disease, but on the contrary a very natural state of things under the circumstances. For a very few months of the year there is an extra demand for labor—for *men, women, and children*—who are only required for special work. Let us suppose the want fully supplied—that the 44,000 regular workers could be recruited at a moment's notice by 20,000 supplementary hands: the special work would hurry on all the faster; swiftly too would it be finished and a few hogsheads of sugar saved; but then, afterwards, unless we could adopt the plan of suspending their animation and putting them carefully away until we wanted them again, we should most assuredly have those 20,000 crying out for bread and for work—filling our ears with their hungry cries, and telling us the bitter truth, which is now so noisily heard in other regions of the globe, that *special work, periodically recurring*, cannot feed men. Fortunately there is no such labor question in Barbados. There is no plethora—no congestion. There can be no influx, as we have said, from abroad: and within our borders the conditions, we repeat, do not exist which lead to impediment or stasis of the annual current of our industrial life. Real competition does not exist, because in this country the conditions of life are so simple—its wants so easily supplied—that with four days' work a-week, any laboring man, supplemented and aided by his wife and

children, can earn sufficient, to purchase his week's necessities, to pay his rent, to subscribe to his society, and yet have a few pence over, which, capitalized in pig, donkey, or ox, form the ever increasing nuclei of those sums which put by in the savings bank await investment in land whenever the land splitter makes his appearance. The means of cheap living prevent friction among our redundant population, and the facilities for saving, even from small earnings, conduces to contentment. An alteration of this state of things would at once create a labor question; a thing to be avoided by maintaining as equably as we can the industrial circulation of our agricultural body, and by so doing prevent dangerous stagnation.

We have no labor question on the European, American, or Australian model; and as regards the alleged scarcity of labor, it resolves itself into this; during the reaping season, as we have said, extra hands are required for "special work;" this want presses chiefly on those, who with large steam mills desire to take off their crops quickly, at the juiciest period, and thus obtain a few hogsheads more. There is but one remedy. We would advise our suffering and complaining brethren to organize a "reserve" force after the fashion of military governments, but then, to be sure, it would cost many hogsheads of sugar to maintain this force during its enforced idleness of nine months in the year.

But that there is a labor question—distinct from the burning social question with which our cotem has somewhat thoughtlessly mixed us up—we readily admit. During the past 50 years, the old bonds which bound men together have been broken. Many of these bonds were infamously unjust, and can only be defended on the ground of expediency; others although salutary were irksome. Good and bad alike they have all disappeared: and the free citizen of the world—rich in the possession of a vote—after having paid his taxes, and performed a few other public duties, and so, to use a local phrase, "discharged his conscience" can safely ask, "am I my free brother's keeper?" This breaking up of old relationship without taking care to cement new ones has probably had no small effect in bringing about the gap now existing between capital and labor. The unnatural gap should never have been

produced, but when common-sense has closed it, the working men of the world will eventually learn that "their best ally is multiplication of capital." When the heated discussion is over, capital and labor, once more joining hands, will live amicably together for mutual benefit. Here too in Barbados old ties have been broken and our industrial relationships begin to lack stability: the actual employer of labor—the manager—is but a bird of passage that rests its wandering foot for a moment on an unstable twig—here to-day and gone to-morrow; the ties between such an employer and his employees must be very loose indeed. So loose that only too often the magistrate is called upon to mend some broken contract. The case is different when the manager by long service has grown almost to be a resident—when mutual respect has sprung up between him and the people whose labor he is called upon to direct. Such mutual respect saves much bickering and heart-burning, and conduces to good work. Again, it has become too much the custom—the natural outgrowth perhaps of the unrest and uncertainty which pervades tenure of office in every department of the agricultural field—to rely on transient labor. The result is bad work performed by wandering gangs who can have no interest in anything beyond the mere day's wage. For in the words of our own correspondent, the whole labor question, as it exists in Barbados, is thus tersely expressed "as long as laborers have no more interest in the plantation on which they work than the wages they earn, so long will our present difficulties continue." When a planter, as the result of his *mature deliberations*, publicly utters such words of wisdom, then we feel assured that the day is not far distant when the workers of this island—employers and employed alike—will be drawn closer together—not only by mere contracts and spots of land held incidental to service—but by ties of mutual interest—of manly interdependence. A docile and hard-working people, gifted with strong agricultural instincts, does not like to be cut adrift. Truly a mistake has been made, but there is wisdom and justice and common-sense enough to correct this mistake before it is too late. The located man, firm and stable in his holding—confident in himself and in his employer—will do twice the work of his half-hearted "picked

up" comrade. Those gentlemen who complain so loudly of their annual losses may do well to consult their rent-rolls and carefully consider these things. An arrangement based on a system of mutual benefit and advantage, would undoubtedly have saved some of those hogsheads of sugar.

Now and again it is thoughtlessly said that education unfits men for work. On the contrary, knowledge of any sort enables a man to work better; if he will but use it, it is an instrument in his hand. Any instrument is better than no instrument at all. By means of his stone chisel the Carib hollowed out his canoe and crossed the narrow seas between these islands; those canoes were the fore-runners of the magnificent steamships in which we travel so comfortably; and so too dissemination of knowledge must gradually improve and elevate the human race, so that, perhaps, there may be as much difference between the skilled worker of the future and the clumsy discontented artisan of our day as there is between the steamship and the canoe of the Indian. Education, progress, and good work are synonymous. Life was not intended to be altogether utilitarian. Man is privileged to enjoy the poetry of life, and to contemplate the beauty of his environment; but it seems to us that the *perfect* workman is always the *cheerful* workman; he uses his tools so cleverly and deftly that he is not in constant fear of injuring himself: and so as he intelligently works he works cheerfully, with his kind heart wide open to admit the brightness and joy of his surroundings. Let us be wise in our generation and endeavor to be skillful in handling those tools, on the proper use of which our daily bread depends; and, above all things, let us learn to respect the honest worker, and to enhance the dignity of labor by teaching our children the beauty and holiness of work.

It is the duty of every man to help on the work of true education—to substitute reason for force; and to ameliorate so far as he can, the conditions of toilsome life, by helping to inaugurate that system of justice which must increase mutual good-will, and redound to our mutual advantage. By thus harmonising our industrial relationship we shall not only maintain our industrial reputation, but shall efficiently solve the only labor question that exists among us.—*Barbados Agricultural Gazette.*

### WONDERFUL TREES.

The subject of *wonderful trees* is an almost inexhaustible one, abounding in interest and curiosity. In our own State are found the most famous groves of gigantic trees in the world, perhaps. One who visited the Mariposa Grove last year writes: "They are not trees at first sight. You can neither measure them with your eye nor sit in their shade—only take in a portion of the brown trunk as large as a good-sized house. It is only by an unusual effort of looking up that we see either foliage or limbs. They are not beautiful—simply enormous."

Imagine one tree measuring 90 feet in circumference; this is true of "Grizzly Giant." "Wawona," sometimes called "Tunnel Tree," has a roadway cut through the solid heart which is 27 feet through, 10 feet high and 10 wide, and yet the tree is vigorous and growing. There are many others equally as wonderful in this famous California forest.

The cypress, in ancient times, was considered a sacred tree, and idols were carved from it. The Pacific Coast Indians were found using it in their ceremony of purification in their wildest savage state.

The mulberry has been called the wisest of trees from the fact that it never puts forth its buds and leaves till the season is so far advanced that there is no inclement weather to be apprehended.

Rosewood is said to owe its suggestive name to the fact that when the tree is first cut the fresh wood possesses a very powerful rose-like fragrance. There are several varieties of this wood and all very valuable.

The Quinnepiac oak at Woodbridge, Conn., which was cut in 1882, was pronounced the oldest tree on the Atlantic Coast. Gen. Lafayette and other officers of Washington's army once rested under its spreading shade while on the march, and a visit to the tree by Woodworth is said to have inspired the poem, "The Old Oaken Bucket."

In front of Macedonia Church, in Columbia county, Georgia, is a quivering tree. Every limb, large and small, on the tree trembles as in fear, or as a suffering animal would quiver, and this occurs when not a breath of air is stirring.

The Scotch fir is a blessing to the country in which it grows. The poor man's hut is lighted by torches made of the branches, which burn most brilliantly owing to the resinous nature of the wood. In the barren parts of Sweden and Lapland the peasants select the oldest and least resinous of the branches, take out the inner bark, which they grind and mix with their scanty supply of meal, making it into cakes called bark-bread.

In the islands of the West Indies grows a tree resembling an apple tree in height and size, known as the calabash tree. It has wedge-shaped leaves, large, whitish, fleshy blossoms that grow on the trunk and big branches. The fruit is much like a common gourd, only a good deal stronger, and often measures 12 inches in diameter. The hard shell of this is cut into various shapes by the natives and is sometimes handsomely carved. It is made into drinking-cups, dishes, pails, and even pots, and can actually be used over the fire for boiling water. But the calabash pot gives out after a few trials over the fire, and is unfit for further service.

Probably the only trees which grow ready-made whistles are those found in the forests of Nubia. When this tree is swayed by the wind, strange sounds may be heard like the notes of a flute, a fife, or a penny whistle. The vocal tree was a wonder to all who heard the mysterious sounds, until explanation was given by a scientific traveler who investigated the matter. • He found that at certain seasons of the year hordes of insects deposited their eggs on the young shoots and ends of branches. When the young insects emerged, small holes were left in the galls. The wind blowing through these openings caused the strange noise.

In New Zealand is a tree fatal to birds. The seed vessels give off a sticky fluid, and many a fly finds himself on the gummy stuff. These flies attract small birds, and they too get so covered with the fluid that they are unable to fly. They are also attracted by the clusters of ripe fruit, which they intend to eat, but when once covered by this fatal gum they remain, not to eat, but to be eaten by other animals.

The most important article for illuminating purposes in Japan is the candle made from the fruit of a tree which very much resembles the common sumac of this country, and is

called "the vegetable wax tree." The berries are the size of a small pea, of a whitish color, hanging in clusters, and contain the wax as a thick, white coating of the seed. The wax is obtained by the berries being crushed, strained and pressed in hemp-bags, or by boiling the bruised seeds and skimming the wax from the top. From experiments made, this tree can be readily grown in this country. It is highly ornamental as well as valuable for its production.

In a part of Africa not frequently visited by travelers, the discovery has been made of a tree which yields butter. Under no system of treatment can it be made to equal that churned from milk, but by salting it is somewhat similar. By heating with a solution of potash or soda it is easily converted into soap.

The "stinging tree" of Queensland is a luxurious shrub, pleasing to the eye, but dangerous to the touch. It grows from two or three inches to 10 or 15 feet in height, and sends forth a very disagreeable odor. Its effects are curious; it leaves no mark, but the pain is maddening, and for months afterward the part when touched is tender in rainy weather or when wet in washing.

A marvelous palm grows in the village of Pedur, in India. Some children plucked its fruit at five o'clock one afternoon and flocked early the next morning to gather more, but they found the branches now far above their heads. Observation showed that the tree had been changing its position every morning and evening. It is 11 feet in height. One who has seen it writes: "At 5:30 the tree was almost lying toward the west. The foot of the tree was at an angle of five to seven degrees with the ground, and we were given to understand that it had already commenced to rise from four o'clock. A handkerchief which had been tied to one of the leaves, so that its other end just touched the ground, had risen six inches. At 8 P. M., the handkerchief was eighteen inches from the ground, and at 3 A. M., nine feet."

One of the greatest wonders of Madagascar is the "Traveler's Tree." Its stem resembles that of a plantain; but it sends out its two wing-like leaves (which resemble a large expanded fan) on opposite sides of the stalk. In an aged tree the lowest of these leaves will be from 20 to 40 feet from the

ground. The fruit grows in large bunches, with three or four such bunches to a tree. The leaves are used for roof thatching and the leaf stalks twirled together serve for the walls of the islanders' huts. The most remarkable property of this, and the one which gives its name "traveler's tree," is its leaf stalks, which, even in the driest seasons, always contain water; and the wayfarer, if he be thirsty, has only to pierce the thick base of a stalk to obtain fully a quart of pure and refreshing liquid.

Newton, N. C., has a curiosity that beats by a large majority the rain tree which gained such notoriety in Charlotte in 1886. It is a smoking tree, and baffles all efforts at explanation. It is a white mulberry tree, was brought from Illinois a year or two ago, and is now about 12 feet high, with a bushy top and many lateral branches. Puffs of smoke, identical in appearance to cigarette smoke, are seen starting every now and then from all over the tree; sometimes from the leaves, sometimes from the bloom, sometimes from the bark of the limbs or trunk. The puffs are at irregular intervals; sometimes two or three at once from various parts of the tree, and sometimes they are several seconds or a half minute apart. They just come haphazard from any part of the tree, and as they ascend in the air, look exactly like the smoke from a cigarette.

Professor Schelwisch, the well-known naturalist of Bavaria, while traveling with the Stanley expedition in the heart of Africa, noticed a plant with a peculiar steel-colored foliage. It was growing like other plants from the soil, but on examination was found to be practically composed of iron. The leaves, although very thin, were bent with great difficulty, and in order to secure one, it was found necessary to separate it from the branch with a file. On further examination and experiment, it was found that the plant, or tree, eagerly devoured any metal its roots might come in contact with, and changed its color to the color of the metal last absorbed.

Major Quincy A. Steele, who has been with an engineering corps surveying railroads in Central America for the last two years, gives an account of some very curious trees he met with there. Among the funniest are the electric-light tree, a tree which gives milk, and the dough-producing tree. The

electric-light tree gives a light so strong that you can read or write by it by night; this tree is not a large one but very conspicuous, and scores of them may be seen over the country, like beacon lights set in the hills.

The milk tree has a big tough skin that can be used for half-soleing shoes. To milk the tree, a hole is bored in the trunk; then it lets down sap as white and as sweet as any even milked from a cow.

The bread from the *bread tree* is not exactly bread when picked, but is a nice stiff dough inclosed in a nutshell about the size of a goose egg. The nut is cracked, the dough taken out and kneaded a little, then is ready for baking. By thinning it down with a little milk from the milk tree, it makes excellent pancakes.

In behalf of those who are interested in trees, I have collected the foregoing from what appears to be reliable literature, and without doubt truthfully describes these forest wonders.—*Cal. Rural Press*.

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### *RAVAGES OF A NEW PEST.*

Last summer a dangerous insect made its appearance in Medford, Mass., and committed terrible ravages upon the fruit and shade trees, despoiling them extensively of their leaves and completely ruining the fruit crop. The insect is now known to be the gypsy moth, a native of all parts of Europe and of Northern and Western Asia, and sometimes found as far south as Japan.

It was introduced into this country about twenty years ago by L. Trouvelot, then living in Medford, but now a resident of Paris. He wished to experiment in raising silk from our native silk-worms, and European moths were imported to aid in the carrying out of the project. Success did not attend his venture, and either through carelessness or as the result of an accident the experimental moths escaped.

As they became acclimated they multiplied to an alarming extent, and now have spread from Medford through Malden, Arlington, Somerville, Everett, Chelsea, Winchester and Stoneham. The section invaded by them covers an area of fifty square miles.

Immediately after the female moths are hatched they grow very sluggish, and in this state can be easily caught and killed. At the end of each feast upon the fresh green leaves the caterpillars are in the habit of congregating in masses upon the branches and trunks of trees. At such a time, and also after they have changed into the chrysalis form, they can readily be brushed off and destroyed.

Early in February a petition was presented to the Massachusetts Legislature by the people of Medford asking that some stringent measures be adopted to prevent the spreading of the gypsy moth and to bring about its extermination. Certain members of the Committee on Agriculture, to whom the petition was referred, visited Medford on the 10th of February. They were surprised at the sight of millions and millions of eggs, clustered not only upon the branches of the shade trees in private grounds and on the streets, but also in apple orchards and upon stone walls.

The result of this examination was an appropriation by the Legislature of \$50,000. The Governor with and by the consent of the Council, was authorized to appoint a Commission, consisting of three gentlemen who should be empowered to plan and carry out such measures as were requisite to cause the extinction of the insect pest.

Professor C. H. Fernald, who has charge of the entomological investigations in the Hatch Experiment Station, and has studied the habits of this insect, is convinced that there is but one sure way of exterminating them—and that is to poison them. This plan has been carried into execution.

As the army of gypsy moths continued to advance into the cities and towns about Medford, the work of destroying them assumed such proportions that it soon became evident that more helpers were needed, and the working force was, therefore, increased to 120 men. Nineteen teams are constantly employed in carrying from one point to another quantities of the poisonous powder and the apparatus for applying it. Each team is provided with 150 feet of hose, a hogshead for water and a long ladder, so constructed that when opened in the middle of the street it is possible from its top to shower the trees on opposite sides at one time. Already three tons of Paris green have been used.

When Professor Fernald was abroad he was told by prominent entomologists that if the gypsy moth once got a hold in this country it would be more of a pest than the Colorado beetle, because it is more prolific and feeds upon so many different plants, while the potato beetle attacks but a few. A bitter experience has proved this statement to be true.

While in foreign countries several species of bugs and insects are known to be hostile to the moths, feeding upon the eggs and young caterpillars, there are none in this country that care to destroy them.—*Philadelphia Record*.

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### NOTES UPON THE OLIVE.

There is hardly a tree which, if it were not already grown on America soil, would be so eagerly desired as the olive. Indeed, it appeals not only to the orchard-planter, but to the poet and scholar. It is in the noblest sense the tree of the home acre on warm southern hill-sides; the tree of the world's Italys, of States like Attica, and of lands like Spain. Men who never expect to plant an olive grove nor, indeed, to see one in its pale and shining beauty against the warm, clear skies, soft as summer haze, the most graceful of created trees, will nevertheless read about the olive with the same kind of interest that they feel in the cedars of Lebanon or the palms of the Saharan oases. The orange and the vine are more universally known, but the olive seems to touch the deeper chord.

On this continent, California olive planters have led in point of time, and in the extent of acreage. The story of those first small olive groves, planted by Franciscan priests at the old California Missions, is one that belongs no less to literature than to horticulture. In rich valleys, by willow-bordered rivers, on high wind-swept mesas or in the midst of the ruins of adobe walls, great olive trees a century old stand lonely and neglected; but they have been parents of hundreds of acres of young and thriving olive plantations in various parts of the State. The famous "Mission Olive" still holds its place as one of the best varieties of the olive known, though slow of propagation and, in some districts, uncertain of yield.

The old trees that still stand show in most cases how widely their stock has been scattered ; they are mere stumps of trees, sawed and hewn into the semblance of fresh pollard willows by those who were planting new groves.

I have seen most of the old Mission groves and single trees. In a group near San Luis Obispo, in a wide field, by some adobe ruins, they look from a distance as large as oaks. On approaching nearer the trees, now nearly a hundred and twenty years old, are seen to be notably picturesque specimens, though much the worse for the axes of the pioneers. At old San Diego Mission, the first that Junipero Serra founded (1769), the once large and well-walled olive garden appears to have covered twenty or thirty acres ; but now it is doubtful if there are more than a hundred trees left, and these are in every conceivable stage of decay. The soldiers who were quartered here at the time of the conquest of California, and for some years after, are said by old settlers to have made fire-wood of many of these olives, though the adjacent river-bottom was full of willows and cottonwoods. Some of the large trees remaining here have often yielded 150 gallons of olives apiece— an enormous yield for an olive tree. The old garden of the Mission San Jose had an avenue of very fine olives, most of which still remains in fair condition.

It is strange that the Mission builders of the Valley of the Rio Grande and of Arizona did not plant many olives. Some of their Missions were established half a century earlier than those of California ; but the olive only appears at long intervals in the southwest. The still older Missions of the Gulf and the pearl fishery regions of Baja, California, had olive groves, and many of them still remain ; but the Texan and New Mexican apostles of the early part of the last century were far less horticultural than were those missionaries who trudged overland from Loreto to San Diego in 1769. The olive was but the type of the manner of men they were. By dint of persistent endeavor the Franciscans, within twenty years, had naturalized most of the leading species of fruits ; they made wine from their grapes and oil from their olives. They planted, too, for posterity ; and the palm trees of the old Mission now form one of the most interesting features of California.

The olive belongs to "the Mediterranean region," and to similar climates elsewhere. In fact, many botanical writers give to these districts the general name of the "Olive region;" it belongs to a land of rainless summers, of dry soils, of short winter rest. A monograph of much interest and value, written by Mr. B. M. Le Long, which occupies about ninety pages in the California State Board of Horticulture's "Report" for 1889, discusses the climatic range and the general "science of the olive" to an extent which cannot be done in a popular article. His conclusions give California a very high rank among olive countries, though even in California many districts are not adapted to its culture.

Hundreds of olive groves in the Coast Range and on the Sierra foothills show that there the tree is perfectly at home. Some of the pioneers in the business, and men of unimpeachable veracity, say that they have netted as high as one thousand dollars an acre from the oil and pickles produced by their olive orchards. The olive is found to require little labor, and can be grown on high and rocky lands, where it will bear earlier than in the valleys, yielding berries the fifth year. Mr. Elwood Cooper, of Santa Barbara, began to plant in 1872; the fourth year some of his trees yielded two gallons of berries and at six years some of the best trees yielded thirty gallons apiece.

The statistics of the olive industry in California have not been separated in the County Assessor's reports, from the general orchard statistics; but, fine young groves are in every county of Central and Southern California and as far north, in fact, as Redding on the Sacramento, at the head of the valley. The Quito olive grove near Santa Clara contains about 3,000 trees, and is probably the largest in the central counties. A special report made in 1886 placed the number of olive trees in the whole State at 63,479, Santa Barbara leading, with about 10,000 and Santa Clara, Sonoma and Napa coming next, in the order named. At the present time it is probable that the total number of trees has increased to 90,000. Thirty-one counties report a few olive trees growing, and ten counties may be said to have fairly begun the industry. There is good olive land in California to duplicate the olive groves of all Italy if the business continues to prove profit-

able. At present, the demand for the guaranteed "pure olive oil" of a few lakers here is so great that, to quote from what one of them said at a meeting of fruit growers, "I raised my price per bottle of my pure oil; in fact, I raised it three times, until I was ashamed to ask so much, and still I could not fill a tenth part of my orders."

Why do not men plant out olives a great deal faster? It is because all the ways of propagating trees, either from seeds or cuttings or from shoots, or by grafting new kinds on old stocks, take great care and considerable time. Every year for ten years nursery men have sold "all the olives they could manage to grow," and could have sold many more. But in a few years the chief difficulties will be overcome, and then olive growing will begin to take its place as a California industry beside the culture of the raisin grape and the prune of commerce, which at present lead in importance. No branch of California horticulture offers more attractions to the skilled planter than the growth of the long-neglected olive.—*Independent*.

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### SCIENCE TEACHING.

Progress is the order of the day: even sleepy old Egypt is bestirring herself: light is entering the dark Continent, and so the foot-tracks of explorers must widen into broad highways, along which the wealth that has been pent up for ages will pour forth for the benefit of mankind. Everywhere our old earth is disclosing new treasures, and pointing out to us, unmistakably, that there is room and plenty for all—that the grinding poverty, and the struggle for bare life, are by no means necessary—are, in fact, no fault of her's, but are the consequences of ignorance, and of that meddling and muddling policy which prevents the commerce of earth from flowing into its natural channels, and fulfilling its appointed purpose of providing for the wants of mankind. If ever we live on this earth in a state of true contentment, we shall owe it to what is called science; that is to say, to the extension of *true* knowledge, the knowledge which enables us to admire, to understand, and to copy (as was intended) the regularity and the order which we see going on unceasingly around us.

The bee and the ant have instinctively learnt that lesson—or rather it has been impressed upon them indelibly by the creative power, and their industrial life, harmonious and co-operative, because natural, is a perpetual contrast to the artificial and antagonistic life of man. Truly in this life we sit and hear each other groan, not because there is so much need for groans, but because political and commercial systems deprive men and women, and even babes, of sustenance, that is to say, of those means of livelihood which abound, but which are prevented from feeding the hungry millions by those artificial restrictions, which, however clever they may be, are not in accordance with the ways of nature.

But there is a new power active in this modern day amongst mankind—a life-giving power, that is quickening dead things into life, opening up the store-houses of nature, disclosing her secrets, showing her inexhaustible treasures, and proving conclusively that the evils of life are for the most part of man's own creation, and resemble more the excrescences of disease, than the natural texture of his environment. And that power is knowledge.

These West Indies have been called dead; the word "forgotten" would have been more applicable: for they are as fresh, and as living, as in the days when Rodney fought for them, and they were of value in the eyes of selfish England; or as when in their primæval beauty they emerged from the ocean and nature hastened to clothe their virgin soil with all the greenery of vegetable wealth. That wealth lies there awaiting the day when it shall be wanted; and no doubt it will be wanted some day. The Englishman will awake, and wonder why so long these rich and favored islands have been neglected, and why their many life-giving products have not been gathered in to feed and to fatten his lean and hungry millions. We are only asleep, ready and willing to be awaked; *they are inert—as good as dead men*—who possess a mighty and varied empire, and do not use it for the benefit of their populations; who shriek from the house-top the advantages of free trade, and yet occupy their time truckling with foreign nations, and making eternal treaties, while all the time they ignore the fact that their vast empire is a world in itself, capable of supporting even more than the millions which

now occupy it, and that free trade—as a *truth* and a *reality* and not as a *sham*—must first be established at *home* before the men of foreign nations can be induced to consider it, or compelled to practice it. Let the British Government develop the trade of their colonies, establish with them commercial relations, based on just and honest principles, and discard that false policy which opens their ports to the bounty-fed products of the foreigner, and yet allows that same bounty (equivalent in its operation to a McKinley bill, so far as the sugar of these colonies is concerned) to bar the door against us. England now cries aloud at the unfriendliness of the new American law because it touches her vital interests; perhaps she will now appreciate the bitter cry that went up from the heart of these Islands when we found our trade seriously hampered and almost ruined by the law of bounties, devised in the interests of foreign nations, contrary in spirit to the free trade laws of England, *but worked on the soil of England*, and operating to our detriment and to our loss. Imperial federation is one of the schemes of the day. Surely if ever confederation of lands, and brotherly union of hearts are to bind these scattered portions of empire together, the process of cementation must begin in the honest work of development, so that new commercial interests stretching out to each other their tentacles across the ocean, may interlace and bind men together on a true and honest basis of advantage, or community of interests. A card playing policy—whether it be called protection or free trade—will never rid mankind of those ills to which flesh is *not* heir, but which have been engendered by ignorance and that incessant shuffling which is diametrically opposed to the orderly and regular methods of nature. Of these methods science is the expounder. It is time that “more light” should shine upon the Western Isles, too long asleep, too long neglected, but *not dead*, only awaiting the magician’s wand to arouse themselves from lethargic sleep, and wanting no more than the guiding hand of knowledge to teach them to gather the rich carbonaceous foods—Theobroma itself—to warm the sluggish blood of the frozen north.

It is meet that this time-honored colony should take a leading part in the educational work, which, like a beneficent

ferment must quicken with new energy the commercial and agricultural capacity of these lands. The schools of Barbados are of good repute throughout the West Indies, and our neighbors have not been slow to avail themselves of the educational advantages which they offer. This is as it should be ; and it certainly is pleasing to think that the love of letters and the higher culture should have, for so many years, radiated outwards in a continuous stream of light from this island. It is time now to supplement the old learning with the new teaching. Pure literature, however great its intrinsic value, can no longer suffice for the mental and physical wants of mankind. A necessity is laid upon us to understand the nature of things. Life, truly, was not intended to be all utilitarian, and if cares and worries are soothed, while its thoughts expand and grow larger under the influence of the beauty and the wisdom that may be gained from a just appreciation of literature, but, at the same time, life is eminently practical, and its daily unpoetical wants must be supplied. Science teaches us how to supply these wants—how to examine everything critically and to turn it to some use ; her single aim is, that none of the Creator's gifts to man be wasted, not even the crumbs. Here in the West Indies there are not only crumbs to be saved, but many valuable vegetable products to be gathered for the benefit of mankind, and the advantage of these islands. Surely the new teaching is the complement of the old ; and we can do no better thing than increase the usefulness of our schools and make their fulness complete by adding to their curriculum that scientific department which is needed not only in the cause of progress generally, but is required to meet our own local wants. We send out from our schools boys who win scholarships, and gain high degrees elsewhere ; we manufacture our own quota of B. A's every year. Is it not time that we should scatter scientific seed as well ? Perhaps in the future we may reach a high standard of excellence ; at all events Bachelors of Science could be turned out as well as Bachelors of Arts and would be of infinitely more use in these islands.

Our Island Professor of Chemistry has taken a large and comprehensive view of our wants, and has hastened to use his influence for our welfare with a zeal which proves that

he is one with us ; for through his representation our Legislature has shown itself quite willing to vote a sufficient sum for the employment of an Assistant, and that Assistant is to be a capable Botanist. The choice is a happy one, and shows that our Professor has, with an unerring eye, spotted the very weakest point in our agricultural community. We are all born agriculturists, it is true, and pride ourselves on our skill ; nay, we are bold enough to boast that we may have no need of these things—that we, practical planters that we are, know how to manage an estate, and to make it pay as well, if no better, than others who know these things. So we talk, and so we boast, but all the time we use those manures which the analyst tells us contain the constituents we require. We use the instrument supplied, *and in more ways than one* forget to what and to whom we owe it. So will it ever be until our school of applied science modernizes us, and makes us more appreciative. There will be no difficulty, with a scientific staff, consisting of two zealous teachers, to form our school applied science, for assuredly its attractions will be such as to divert a goodly stream of advanced school boys from their ordinary studies, and these will be the leaven that, by and by, will leaven the whole inappreciative lump. But the process will be slow ; for only by slow trickling, *as things are*, can the new knowledge permeate the planter class, and change its character. *As things are*, we repeat, because it is a lamentable fact that the better class of young men—even the sons of leading planters—avoid the drudgery of their fathers' calling because they learn too often, by painful experience, that after all it can only lead to a "management," which is held by a most uncertain tenure, and which without a moment's warning may be lost although duty may have been honestly performed. An arduous and self-denying course of preparation, without any positive goal worth the name, could not possibly attract even a lad who has reached the fourth form in one of our public schools ; these all seek clerkships, or emigrate. Much less will the agricultural ranks be likely to attract those who have attained proficiency in a scientific school. But nevertheless we shall do right to establish our school, knowing well that its influence must eventually be beneficial. Well for the future of this island will it be, if our

Agricultural Society, and all those who desire to maintain the value of our landed property, will take counsel earnestly together, and try to ascertain, and to remedy, those defects in our system which at present cause respectable young men to turn their backs on the time-honored "planters' profession," and to leave it as a drudgery only suited to an inferior class, who, for the most part, are only turnkeys, without the slightest power, or desire, to be anything else. We have decided rightly to add to our scientific staff. Let us, at the same time, take care that we reap the benefit, and let us do all in our power to induce intelligent young men to turn their attention to agriculture. Such is the primary object we have in view, and we shall hardly be wise in our generation to lose sight of it. But if agriculture desires to be benefited by knowledge, it must be endeavored to attract it, and offer it inducements to stay. Vain will be our Experimental Stations, and all our boasted improvements to maintain our agricultural supremacy, unless their operations are aided and augmented by the intellect of the country which must be *retained* as well as *trained*.—*Barbados Agricultural Gazette*.

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### THE LOUISIANA SUGAR REFINERY.

Nearly twenty years ago Edward J. Gay, Jr., took charge of the erection of the sugar refinery about to be built by the firm of Edward J. Gay & Co., of which firm his father was the senior and he the junior member. This refinery was known as "Gay's" for a while, but some time after the death of this promising young business man his father sold it to a stock company, and it was thereafter called the Planters' Sugar Refinery.

The capacity of this plant was to refine about 100,000 pounds of raw sugar per diem, and it was by far the largest in the South.

In 1883, Mr. Eastwick, who had been superintendent of Thompson's refinery, got a number of local capitalists interested in a sugar refining enterprise which was destined to dwarf the record of Gay's and eventually to absorb it, or rather join it to the larger plant. The new company was called the Louisiana Sugar Refining Co., with Mr. John

Wallace as its president and Mr. Eastwick general manager.

It started out with a capacity for refining about 200,000 pounds per diem, and has since increased in size until now the output approximates 600,000 pounds of the best refined sugars in the market. On the organization of the trust, the Louisiana and Planters' both going in, it was decided to place Mr. Eastwick in charge of both plants and subsequently it was decided to run a pipe line connecting the two plants, so that to-day, although about 1,000 feet apart, they are virtually one refinery, as the juice is pumped from one to the other when necessary, with just as much ease as from the melters on the ground floor to the "blow ups" in the upper stories.

That a fair idea may be had of the magnitude of this connected double plant, the following figures are given :

The number of hands employed amount to 700, all men, and as the work is such as to require not only strong, able-bodied men, but in most instances skilled mechanics, it would be safe to say that the salaried expenses will approximate not less than \$1,750 per day.

The total output is now averaging 3,000 barrels of refined sugar every twenty-four hours, or about 900,000 pounds daily, which, at an average cost of 6 cents per pound, will amount to \$54,000 as the value of one day's product, a business which, if kept up the entire year, would amount to over \$16,000,000.

When the sugars are purchased from the brokers on the levee they are brought to the ground floor and the barrels or hogsheads, as the case may be, are emptied into large vats called melters, where they are dissolved in water, a large paddle being kept in motion by machinery to facilitate the process.

The solution, which is technically called "juice" is then pumped to the top story where it goes into what are called the "blow ups," after which it passes to the bag filters, of which there are twelve, each being provided with sixty bags; the juice comes out of these a pale amber color, entirely free from all foreign matter; after one of these filters has been in use a certain length of time the flow into it is stopped, the iron casing opened and the bags, which are about five inches in diameter and five feet long, taken from their hangings and washed, then the water in which they are cleansed is passed

through another filter under pressure, where any saccharine matter remaining with two washings is taken out and worked into low grade sugars.

In the meantime the first filtration passes to the "char filters;" these are large iron cylinders filled with bone black or animal charcoal. The juice from first grade sugars when it comes out of these filters is as clear as spring water; from here it passes to the vacuum pan, whence it is dropped in large vats to be taken out by small cars and conveyed to the centrifugals, and from this last the pearly white grain goes to the granulators, huge revolving cylinders with a stem coil at the core and a double set of sieves so as to separate the powdered sugar from the large grain and the lumps. Sugars to be used in the manufacture of candy are not granulated, and the grade which is to be made into cut loaf (cubes) passes to a hopper, from whence it is fed automatically by means of a revolving cylinder to a pressure, which forces it into apertures of the required size in a revolving brass cylinder placed beneath it. As the cylinder revolves, the cubes are pressed out automatically and fall on sheets of iron which are constantly being carried underneath it on carrier belts. These are taken off by the workmen and placed in small ovens, where the cubes are thoroughly dried and are then ready for use.

The granulated sugar is fed into the barrels, which are placed on large cast-iron plates made to rock by a simple device of revolving pulleys having an uneven diameter bearing on the plates on the underneath side. In this way one man can pack three barrels at once, and the fine powder is made to settle compactly. In some cases the demand for sugar comes from sections of the country where wagon transportation is impossible, to supply this demand, the Louisiana Refinery has a force of men packing in sacks of suitable size and strength.

To return to the bone black filters; the bone black has to be rewashed, recharred and dried after each using; this necessitates a large plant of itself.

The power to perform all this work is derived from two grand batteries of boilers, each having a power of about 800 horse-power. The last set put up are supplied with the

Rooney automatic coal feeders; by this system the doors of a furnace need not be opened except in cases where it may be necessary to clean fires.

An electric light plant and a multitude of engines and pumps too numerous to mention complete the list. A perfect fire department system has been established, and on an alarm of fire from any department the engineer in charge can supply an abundance of water from the company's main, which connects with the river; the pump kept in reserve for this purpose has a larger throwing capacity than any half dozen engines in the city.

At the time of the *New Delta* man's visit the warehouses, sidewalks and refinery were all full of sugar coming in, being refined and hurried off to the consumers' breakfast table.

Across Bienville Street on the river side is the large seven-story building recently put up by the Louisiana Company for the Brooklyn Cooperage Company. It is a substantially constructed building, and will rank well with any in the country. Although nearly 100 feet from the refinery, by means of a viaduct placed across the street barrels can be readily run into the packing-room from it.—*New Delta, Louisiana.*

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### CAMPI'S SUGAR GRAINING APPARATUS.

Amongst the latest novelties brought forward, the sugar graining apparatus of Campi is worthy of special mention; but so far, we can speak of it only through reference to the inventor, who declares that his apparatus produces with a smaller loss a dryer and better granulated sugar than any of the vacuum pans known to this date.

If truly so, the advantages claimed by the inventor are worthy of consideration, especially if, as he likely affirms, sugar can be purged "hot" with the same results as to quantity, quality and keeping conditions as when purged "cold."

On this account it would be quite convenient to the inventor's interest to set one of his apparatus, for his own account, on some of the large plantations on this island, so as to show its advantages in a practical manner, and were the results to be as he asserts, he would soon receive more orders than he could reasonably expect.—*Havana Weekly Report.*