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OF THE HAWAIIAN ISLANDS.

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[No. 7.

There has been no change in the price of raw or granulated sugar during the past month.

Mr. E. M. Walsh, late manager of the Makaweli Plantation, has retired from plantation life altogether.

Planters and others should give more attention to the raising of work horses and mules. Thousands of dollars are sent out of the country every year for animals that can and should be raised here.

The list of officers and committees of the Planters' Labor and Supply Company will be found on the last page of this number. Readers will bear in mind that the annual meeting is less than three months off, and those who have reports or essays to prepare for the occasion have ample time to study their subjects, and gather material from their own experience or that of others.

The reciprocity policy adopted by the American Government appears to be very popular with the West India Islands and the Central and South American republics. Some of which have given favorable responses to the proposals, and several of them have already concluded reciprocity treaties, the re-

sult of which will be a closer commercial union between them and the United States, under which the latter will probably purchase the bulk of their sugar and other tropical products.

A correspondent requests us to ask managers and sugar-boilers to give their experience in regard to precipitators. He says: "It was at one time the opinion of about everybody that precipitators were a decided aid in settling and cleaning the juice, and such has been my experience; but I find one or two sugar-boilers that do not agree with me in this matter. If these precipitators are of no use in settling the juice they must be a detriment, as they require the juice to stand: but I have generally found that where they are used there is also found the highest polarization, and the best results all round."

The editor acknowledges the receipt of several publications, including the "Ninth Annual Report of the New York Agricultural Experiment Station," at Geneva, for 1890.

The Bulletin of the Agricultural Experiment Station of Nebraska, Sugar Beet Series, No. 2.

Bulletin of the Louisiana State Experiment Station, relative to Diseases of Farm Animals.

Proceedings of State Agricultural Society, held at Alexandria, La., January, 1891.

The Ramie Plant, by W. H. Murray, Supt, of Ramie Culture in California.

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WITH OUR READERS.

A correspondent, on page 297, gives some valuable points in regard to the proper setting of steam boilers, which could only have been gained by long experience. His reference to the different results obtained from boilers in different localities, that were set in the same way as nearly as possible, may perhaps be explained by the different elevation of the two localities, or the fact that in one, owing to proximity of high land, the wind had a downward course instead of a rapid upward course, sufficient to make a perceptible difference be-

tween the two. The question raised by our correspondent is one which will bear observation and study.

A very readable story is that commencing on page 300, describing a sugar plantation on Barbados. It sounds like a tale of a hundred years ago, when sugar plantations and mills were run in the primitive style by the jolly darkies who have passed from the modern scenes.

Following the above, page 308, is a really instructive essay on plantation managers, which every one interested in sugar should read. The writer is evidently a man of culture, experience and keen observation, whose sympathies and arguments are enlisted in the advocacy of a higher standard of merit for plantation managers: "If we would maintain our agricultural supremacy we must induce the right sort of men to enter the agricultural ranks. * * * Those interested in maintaining the value of property must recognize the importance of bringing the soil and the right sort of men together, and take their measures accordingly."

Several articles on sugar, and the sugar market, including the beet sugar bounty of Germany, possess interest, and throw light on the cost of production and refining. The competition between beet and cane sugar is likely to be more sharp, but the cost of beet sugar, stripped of its bounty, is probably fully as much as that of cane. The success of European beet sugar is wholly due to the aid given to it by European governments; without that aid, there is hardly a doubt that the production would decrease till the price advanced to such a figure as to check further decrease and better remunerate the sugar producers, whether of cane or beet.

The question as to what kind of sugar should be made for the American market is discussed on page 327. There can be but little doubt that if our planters were released from contracts and were able to place their crops on the Eastern American markets, a choice coffee grade would be the most profitable. But at present there is no way to reach the Eastern market except by heavy railroad charges or shipment by sail or steamer around the Cape.

An effort is being made to give an impetus to the cultivation of ramie in California, by the publication of tracts drawing attention to it. From one of these we have taken

a few paragraphs, showing how the plant is cultivated in that State, and there is very little difference here. The Hawaiian Ramie Company's machine for cleaning the fibre is said to be as good as any in existence, and we understand that Mr. Frank Winter, of this city, is prepared to buy all the fibre that may be grown and cleaned here. He has recently been to the United States to ascertain what is wanted and the best condition in which the fibre should be prepared and sent from here. We shall refer to this subject in another number.

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NOTES FROM MAUI.

Mr. Editor:—Most of the mills are now through grinding, and the output is fully up to the estimated yield. Some are a little above, some slightly below, but it is safe to say the yield of this island is as good as was expected. Better results would probably have been secured on most of the plantations had it not been for the scarcity of laborers. Cultivation was unavoidably neglected in some places through this cause, to the detriment of juice, sugar, and the crop generally.

We hear no reports of any very large yield, as in former years, still, notwithstanding this, the yield per acre is about as good as in former years.

The art of cultivation is considered to be well understood on Maui, which is shown in the success achieved by some of the planters, but some exceptionally fine work may be looked for now in the way of economical management, which will put in the shade all former efforts. And this economy will have to be practiced, not only in the field, but in the mill and every part of the plantation.

In manufacture the work has been fully up to former years, indeed, we might say some great improvements have been introduced which have surprised as well as encouraged those who have seen them. In rolling or grinding cane the Wailuku mill has come to the front with an extraction which surpasses anything known so far in the way of grinding, and it is thought that it has not yet done its best work.

The diffusion plant at Hamakuapoko is now working smoothly and satisfactorily, and may be considered another

success for diffusion. The diffusion plant at Waihee has not worked as well as was expected, but so far as can be learned, it in nowise differs from the rest of the plants put up on these Islands, nor are the difficulties or obstacles encountered so great as have been met and overcome by other mills which have preceded it. Another season will probably show better results.

We hear very little talk now of making extensive changes in sugar mills, excepting such improvements as can be made on the place without large expense. They will be put in the best possible condition, so as to obtain the highest results from everything, and at the same time avoid waste, loss and all unprofitable expenditures.

It always pays to keep a sugar mill in first-class condition, not only in the engineering and boiling departments, but in every other respect. Paint and whitewash cost but little, yet how great is the improvement which they effect. Nor does it cost much to keep things clean and presentable, yet how often are they neglected and allowed to remain a disgrace to the place. We all know it is much easier to notice defects than to remove them. It is a good rule to have a place for everything, and everything in its place, but it is not always so easy to do it. When, however, the crop is off, there is no excuse for this neglect.

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BUDDING ORANGES.

W. J. Stover, a fruit grower of Jamaica, West Indies, writes his experience to the Editor of the *Demerara Argosy* regarding the best mode of propagating oranges, as follows :

“Since January I have been budding with sweet varieties the sour orange stumps which are now growing irregularly over many of the properties. I was bothered much at first to get the right season. Although this is a tropical climate, orange budding can be done successfully only when buds are well developed and beginning to shoot, and the bark on the tree to be budded is very loose. The proper time here this season commenced about April 1st, and improved as the season advanced. Trees in the same locality are not always right at the same time.

“Grafting has not succeeded. In all cases I now bud with a single eye, and tie with waxed cloth. There is but little difficulty with young thriving trees. With larger trees and thicker bark a large per cent. fail. Therefore we have the trees cut to a stump about four feet high, allow sprouts to spring out, and when the bark is sufficiently formed (a few months growth) single buds are placed in several of the young shoots, which are treated like seedling trees. All oranges, whether planted as sweet or not, ought to be budded. They bear earlier and are true to variety.

“I do not know that you have sour orange trees in Demerara, but we have many here.”

[It is probable that the cumquat or China orange, so abundant here, may be found to be a good stock for budding and propagating orange trees.]

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THE BANANA INDUSTRY.

The extraordinary increase in the demand for bananas to supply the American market, has led to more attention being paid to cultivation of this fruit in all the tropical countries whence the demand can be supplied. We read of 30,000 banana roots being shipped from Jamaica to another of the West Indies group to start a single plantation. And now the Demerara people propose branching into the business, and promise large supplies. The *Argosy* of a recent date says:

“In no country in the West Indies can the cultivation of the banana be carried on with greater advantage than on the flat and easily cultivated fields of British Guiana, and in no other country can there be a greater need at the present moment of a new industry to supplement the one main undertaking upon which almost the whole of us depend for our existence either directly or indirectly; but notwithstanding the fitness of the country in an agricultural sense, and the great need there is for making provision against very probable hard times in early store for us, and notwithstanding the fact that the Boston Fruit Company, whose assistance of Jamaica has been of such immense benefit to that colony, have given us the warmest invitation to co-operate with them towards the development of a fruit trade, the Government

have made no practical effort to promote the scheme beyond appointing an erratic Commission of Enquiry. . . . Sugar has been a noble friend to the colony for many a long year, and long may it continue to be one; but it has fallen upon very parlous days, and estates are finding it difficult to fight the battle of life. The banana industry is not an enemy of the sugar cane; for the two products can be grown together on the same estate to advantage; and the younger relative might become a very useful and valuable stand-by in bad times, like the present; while to the peasant farmer it would offer a profitable and certain source of income; and to the population in general it would soon become one of the main sources of sustenance and wealth."

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SUGAR MANUFACTURE.

Since the introduction of free sugar to the United States, says the *American Exporter*: the sugar planters and manufacturers in Cuba are especially interested in the respective merits and economies of the two principal methods of manufacture now in use there, especially as to the results obtained by the comparatively new method, the "diffusion process." So far, there have been complete diffusion plants erected on three or four of the leading plantations in Cuba, but the general opinion seems to be that only on perhaps one estate, the "San Juaquin," owned by Count Ybanez, have successful results been obtained.

From the recent reports of the working of that plant, there is no doubt that practically all of the available sugar is obtained from the cane, but so far we are without definite and accurate figures as to the economical results, that is, how much more money is actually obtained from the crop, worked by diffusion on the Count's estate, than could or would be obtained from handling the same sized crop with the most approved and improved methods of milling, several of which are now in use in Cuba and other cane growing countries. This improved method of milling would probably comprise, first, a previous preparation of the cane by either shredding or comminuting, so as to have it in the best possible condition for the extraction of the juice by powerful mills; the milling

to be done by two, three or four stages, that is, passing the cane through that number of separate mills, and between these different mills hot water to be applied freely to displace the juice remaining in the bagasse.

It seems to be well established that under this method of milling an extraction can be obtained, approaching to within six or eight per cent. of the average results obtained by diffusion, while the dilution of only a portion of the cane juice, and not including any of the juice that is expressed by the first mill, is not nearly as large as is required for good diffusion work. But perhaps a more valuable feature than that, and one representing a larger interest to the general planter, is the fact that under milling as above described the planter still has all of his bagasse left as a fuel, and that notwithstanding the high degree of extraction and the supplanting of cane juice in the bagasse by hot water, this fuel, with the use of good green bagasse burners, furnishes a great abundance of steam for all the work required in the sugar house, including the extra evaporation connected with the dilution of the mill juice by the saturation of the bagasse.

It seems to be well settled that only those estates that are situated near sea coasts where foreign coal can readily be discharged, and therefore obtained at a low price, can afford to dispense with their bagasse as fuel, and buy coal to take its place under their boilers. The general opinion among the best informed planters is that until coal can be procured at much lower figures, and also until some of the more expensive features now connected with the diffusion process can be removed, good milling, even when not arranged to secure all the economical results specified above, can and does more than hold its own against the average results now obtained or that can be expected from treating cane by diffusion. There is no doubt, from the great interest now manifested in this subject, that many planters will improve their milling machinery, endeavoring to get as good results as are now obtained or can safely be promised by the diffusion method. In this they are much encouraged by the fact that such improvements in milling can be made at comparatively small expense, and without remodeling their entire plant and expending large amounts of money.

CORRESPONDENCE AND SELECTIONS.

STEAM BOILERS IN SUGAR MILLS.

EDITOR PLANTERS' MONTHLY,

Dear Sir:—The setting of steam boilers, and the construction of furnaces that are best adapted for burning trash is a subject which has and is still receiving much thought and consideration. The great aim has been to build a furnace which will secure a perfect combustion of the fuel at all times, and also to so arrange the boilers and heating surface so that they will absorb and take up all the available heat.

To accomplish this, no end of changes have been made, and all manner of devices tried and experiments of various kinds made, and still absolute success has not been reached by any single person. But this is not strange; perfection is hard of attainment in the ordinary affairs of life; how much more so in this where so many elements have to be contended with and numberless difficulties overcome!

Of the many devices and experiments in furnace construction which have been tried in the past, none came so near to what is actually needed as the "smoke burners," which now, strange to say, have almost totally gone into disuse. These smoke burners were sound in principle, but faulty in their application and construction. Everyone must have seen the benefit derived by their use, but none wanted the trouble of taking care of them.

The great objection to them was soon made manifest by the giving away of the mason work which partially enclosed them, and this was a constant source of trouble, from beginning to end. This was about the experience of everyone, and is mainly the cause of their disappearing from use. That they were actually a great benefit, while intact, I have positive proof, and would like to mention the circumstances. This occurred some years ago, before the two-roller mills had come into general use on these Islands, and when the possibility of burning green trash was hardly thought of. It however occurred to me at that time that there might be a possibility of burning this green trash direct from the three-

roller mill, providing everything was made favorable for the trial. Before this trial was made, measures were taken to prevent loss of heat, or waste in any way. In this trial no cold water was ever used by the steam boilers. If any water was needed above what was condensed in the pans, etc., it was taken from the vacuum pump, which was at a temperature of 120 degrees F. Every particle of the steam pipes was covered with the best covering, and precaution taken to prevent waste by radiation or in any other way, but we never derived any success until the "smoke burners" were adopted, and then not only did we burn the green megass, but saved fuel. Is not this proof? most certainly it is. Still there are people to be found who have no faith in them.

I use this illustration, not for the purpose of trying to revive these smoke burners, but to show that they were a step in the right direction, and it is the direction in which we may look for further improvement. The effect of these smoke burners was to heat the air to a very high temperature before it comes in contact with the fire. The advantage of this will be readily seen when we state that it requires about twelve pounds of air for the combustion of one pound of coal, and it will make a very considerable difference in the value or efficiency of this pound of coal whether the air needed for its combustion stands at 70 degrees or 500 degrees F. This is where the utility of heated air comes in; but to secure the most benefit and to get the highest results we must take the heat that is necessary for this purpose from the waste gases, or some place where it would otherwise be lost. This hot air not only has these advantages, but gives a higher heat in the furnace, which secures more perfect combustion. In this connection I would mention the hollow grate bars lately introduced, and which are spoken of in the highest terms by those using them. These bars are mainly used in connection with a forced draught, and are especially designed for diffusion chips.

The best furnace, or the one which has given the most universal satisfaction, at least for burning trash from the five-roller mill, is the step-ladder bars, and when used in connection with a hot blast, or even hot air, it surpasses any other kind ever seen on these Islands.

Great things were promised and grand results expected from the Jarvis furnace. The inventor claimed so many advantages for this new style that a great many doubted him from the first. In the first place it was expected that it would burn green trash equally as well as dry; indeed it was supposed that the water or moisture contained in the megass was rather an advantage than otherwise, for by this process it was to be turned into an agent of heat and do a great deal of good. It is needless to say that no such results were obtained.

It must be admitted, however, that this furnace has some advantages, although I am not prepared to say how much; but I have noticed that it gave an intense furnace heat when in good order, and was quite an advantage in many respects.

THE SETTING OF STEAM BOILERS.

In regard to the setting of steam boilers there is something peculiar, either in the atmospheric influences of different localities or in the general surroundings of a sugar mill which very materially affect the working of them, for we find that while one kind of setting answers admirably in one place, the same kind will not work nearly so well in another, and this may account for the great variety of settings we see in different places.

The most common, however, is what is known as the Hind's tandem boilers, and consists of one flue and one tubular, set tandem. It was usual at first to fire under the bottom of the flue boiler, the gases passing under the tubular and return through tubular and flue to the chimney.

There are others again that prefer the same setting, but fire through the flue boiler first, thence through tubular and return under the bottom of both to chimney. Another change is to fire through flue and tubular boilers, thence direct to chimney. There can be no question as to the loss resulting from this mode or style. Still another change is to fire through flue and tubular, thence to superheater and chimney. This may be called the latest, and, strange to say, from what I can hear, the best setting of all. This style of setting was tried at the Waiakea mill last season, and although they are known to macerate beyond all others, they still have plenty of fuel from their trash.

There are quite a number of single tubular boilers which give good satisfaction, and quite a number of other kinds that are too numerous to mention in detail.

SUPERHEATERS.

The superheater is now in use in most of the best mills on these Islands, and has generally given the best satisfaction. There can be no question as to the benefit derived therefrom when the escaping gases are of a high temperature. In such cases they give most astonishing results, but when these gases are low, say below 400 degrees F., they do not do so well. Heaters are generally set in a vertical position, with chimney placed directly over them, and it is in this position that they give the best results.

INVESTIGATOR.

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LIFE ON A SUGAR PLANTATION.

Barbados, the most easterly of the Lesser Antilles or Caribbean Islands, is one of the most highly cultivated spots on the surface of the earth. It is about the size of the Isle of Wight, and has been aptly described as a huge allotment garden, for the fields are not large and there are no fences. The whole island is parcelled out into small estates and still smaller holdings; nearly every acre is cultivated and, except in the immediate neighborhood of dwellings, little else is grown besides sugar cane.

The three most prominent characteristics of Barbados, the objects that meet you at every turn, are coral-rock, sugar cane and "colored" people. The island is girt with coral reefs and six-sevenths of its whole surface consists of coral-rock; ancient reefs that have been raised from time to time above the sea, and now rise in broad terraces or plateaux, tier above tier, to a height of 1,100 feet above the sea level. It is to the labors of the coral polypes in bygone ages that Barbados owes its great fertility and its present prosperity; for the coral-rock everywhere supplies an excellent soil, a deep red loam on the higher level, and a rich black earth on the lower plains; and it is only in the area which is not covered by the rock that any barren tracts are found.

Sugar is king of Barbados, the whole commerce of the island depends upon the cultivation of sugar cane; in summer-

time the island is clothed in a mantle of bright green cane, in crop time the fields are cut and the mills are at work, and every available cart, mule and ox is engaged in drawing the cane from the fields to the mills.

Last, but by no means least, as a special growth of Barbados, are the colored folk, black and brown of various hues. They are the workmen and laborers of the colony, and, consequently, they form the greater part of the population; by their labor the cane is planted, tended and finally cut; by them, under white superintendence, the sugar and molasses are made, and by them the casks and hogsheads are driven down to the coast. Quashee and his wife and children are everywhere, and all of them are wanted when the crop is gathered in.

To this green island let the reader imagine himself transported, and driving out of Bridgetown, along one of the white roads that lead to the higher part of the country. The sun is very hot, though it is early in January and its heat is tempered by the fresh trade wind. We pass a continuous succession of cane fields, and meet a nearly continuous procession of carts and drays, drawn by mules and oxen, and driven by lively black jarveys who are not too careful in getting out of the way. We pass through many country villages or hamlets of the small and airy cabins which are the habitations of the colored folk, and where the children seem as plentiful as rabbits in a warren. We skirt and cross several of the curious ravines or gullies that traverse the island, and, though they are evidently watercourses, they seldom have any water in them, so porous is the coral-rock through which the channels are cut. We climb several hills, the steepness of which is mitigated by cuttings through the rock, cuttings that are often picturesquely draped with ferns and festoons of creeping plants. At length we ascend the last slope and find ourselves on one of the highest plateaux in the island, and in front of the house where the writer spent most of his time in Barbados.

The house itself is a curious domicile, old and weather-beaten, only one story high, with a covered veranda in front which is reached by a flight of stone steps. On one side is a garden full of rose trees, rather wild and straggling, but

blooming luxuriantly in the winter sun. On the other side is the stable yard, overshadowed by the spreading branches of a Barbadian fig tree, a tree that has rather small leaves and still smaller fruit, hard and uneatable ; but, in this climate, shade is more needed than figs, and the tree was planted for the shade it gives.

In front of the house stands the sturdy stone-built windmill, the motive power of the cane-crushing machinery. Beyond this is the boiling house, where the sugar is made, while the stalls for the oxen and mules occupy another side of the open space round the mill.

The house and its surroundings may be regarded as a tropical counterpart of an English farmyard ; but the agricultural operations and the people that perform them are so different from those on an English farm that there is little to remind one of the latter, except the familiar presence of fowls, turkeys and guinea-hens.

The estate is not a large one, only 272 acres in extent, yet during the half year no fewer than eighty people are permanently employed upon it. All round the yard and house spread the open cane fields, and not a cottage or cabin is in sight. Where, then, do the people live ? The answer to this question will be found by walking through the cane field to the north of the house ; on the further side of this the visitor finds himself on the brink of a vertical precipice, part of the great escarpment in which the coral-rock terminates, and which encircles the only rough and rugged portion of the island.

The view from this cliff is exceedingly picturesque ; it drops in sheer descent for about sixty feet, and at its foot is an irregular slope formed of large masses of rock which have fallen from the cliff ; on this ground the "darkies" have built their little cabins, which are dotted about on and between the huge boulders, half hidden by the broad leaves of plantains and bananas. Here and there rises the glossy, dark green foliage of a breadfruit tree, while beyond, in pleasing contrast, lie sloping fields of bright green sugar cane on either side of an open valley that leads to the sea.

A more pleasant and suitable site for a small hamlet could hardly be imagined ; the great cliff affords a certain amount

of shade from the southern sun, while the healthy trade wind can sweep freely into the hollow, the fruit trees afford a supply of wholesome food, and at the foot of the tumbled slope rises a spring of clear and sparkling water.

We cannot leave the cliff without noting the more distant view which it commands over the north-eastern part of the island. The aspect from this is very different from the other portions, and it is locally known as the Scotland district, because its system of hilly ridges and valleys seemed to some early Scottish colonist to be a miniature representation of the physical features of his native country. Bissex hill, rising to a height of 966 feet above the sea, fills the middle distance, but over its western shoulder a wider prospect opens of ridge beyond ridge, every slope furrowed by little watercourses that lead into the dividing valleys, the whole enclosed and dominated by the sweep of a bold escarpment of coral-rock, which is the continuation of that on which we stand. Beyond the termination of this escarpment, as well as over the top of the near hills, spreads the broad plain of the Atlantic ocean, reflecting the bright blue of the sky and sparkling in the sunshine, except where the floating clouds are mirrored in dark patches on its surface. The ocean ripples into the hazy distance, where the water seems to mingle with the clouds, and it is only by looking along the deep vista of the cloud-speckled sky that one can realize how great that distance really is.

But it is time we returned to the yard, where the coopers are busy putting together the hogsheads which are to hold the sugar and molasses. The staves of the barrels are returned to the estate, and, after being cleaned, are made up again into hogsheads every year; great is the noise, therefore, for several weeks before the crop is cut, as the hammers ring with a rhythmic beat on the hoops that are driven round the barrels.

The two great annual events on a sugar plantation are the starting of the mill and the finishing of the cane harvest. The first canes are generally cut and carried to the mill in February, and the last canes are not cut until June or July, for, except in the few cases where steam machinery is used, the planter is dependent on the wind, and he must not cut much more cane in one day than he thinks he can grind in

the next ; if the wind fails him operations are stopped, and even if he starts the mill in February, before the canes are quite ripe, he may not be able to finish before July or August, if the estate be large and the season unfavorable.

Just before "crop time," fodder generally becomes scarce, and some of the smaller growers cut some of their unripe canes, which they sell to the estate managers at sixpence a hundred, while in their place some other crop, generally sweet potatoes, is planted. The canes thus bought are used for two purposes—a piece of the stalk about a foot and a half long is lopped off from each, and these are planted in the rotation fields, new leaves and cane stalks quickly springing from the old hulum ; the juicy tops and green leaves are given to the mules and oxen, who munch them eagerly.

No fewer than forty oxen and twenty-four mules are required for the work of this estate. The oxen are not nearly so large as English animals ; they are, indeed, a special breed, with small heads and long, well-shaped muzzles, soft, quiet eyes and a patient, good-tempered aspect, even the bulls submitting quietly to be harnessed. The yoke consists of a U-shaped piece of iron or wood like a large croquet hoop, and the prongs fasten into a bar of wood, which goes over the neck behind the horns, and is linked to the corresponding bar on the companion ox, the pair of animals being thus obliged to move in unison. Six oxen are generally yoked into one cart, and the carter walks by their side, turning and guiding them by strokes of the long whip he carries, and encouraging each animal by his own proper name. When the last load is drawn for the day, the creatures are taken out and wait quietly while the bar is unfastened and the hoop is turned round, then they walk off sedately to their stalls, where a good meal of cane tops awaits them.

Crop time is not only a busy time, but a "good time," as our American cousins say, both for man and beast, and the darkies are always glad when the master decides to start the mill. Then the laborers know that they will obtain continuous employment and can earn good wages, for, not only the men, but most of the women, and nearly all the children who are more than twelve years old, are employed in the work. They generally have permission to eat what cane they like

while they are at work, and are often allowed cupfulls of the boiled liquor that is being made into sugar. This liquor, and even the raw cane juice, is very fattening; the men get stronger and the women and children get plump, the mules and oxen put on flesh, for they too feed on the leaves and shoots of the cane.

It is like a prolonged harvest time at home, but with more of the old fashioned freedom and mirth than is seen in modern England. Of course there are good seasons and bad seasons, as elsewhere, but it is seldom that very much cane is spoiled.

The mill is an ordinary windmill, which works three rollers revolving against one another in such a fashion that the juice falls into a trench below, while the squeezed cane is pushed out on one side; this crushed refuse is called trash, and is used as fuel in the boiling house.

Let me try to describe the scene in the yard during crop time, and on a good day, when there is a brisk wind to turn the mill and a bright sun to dry the trash. The teams of oxen and mules are constantly bringing up carts laden with fresh canes, which are tipped out on to the ground round the mill; one set of men carry canes to the rollers, where two men are engaged in thrusting them in between the crushers, and another set of men take away the trash. This trash is spread out over every available space in the yard, which is generally laid out on a slope, so that the rain may run off easily.

A small army of girls and boys is engaged in this spreading of the trash, and in constantly turning it over with their feet so that it dries in the sun and wind, and when any is dry it is gathered into heaps, from which the boiling house is supplied with fuel. The children laugh and chatter at their work, and would put more power into their tongues than their feet if they were not kept in order by the overseer, who is generally an oldish "nigger" specially told off for the duty of superintending the children. The troop of little brown and black legs moving in line amidst the yellow-white carpet of cane trash is a picturesque sight in its way, though not perhaps so pleasing as a view of the "laughing girls" who "trod the vats of Luna."

On this estate it was considered a good day's work if four hogshead of sugar were made in the day, but more could sometimes have been made with larger boilers, for occasionally the mill would be obliged to be stopped because the receivers and boilers were full of liquor. So the work goes on as long as the daylight lasts, and even when the last load is drawn for the day, and the throng of workers have gone to their homes, a few remain to feed the mill with canes; the air still thrills with the beat and hum of the mill-sails, and is redolent with the peculiar acid-sweet scent of the crushed cane.

Sometimes, when the heaps of cane have accumulated unduly, and the wind has not wholly died away as night comes on, the mill is kept going far into the night in order to make up for lost time, and if there be a bright moon the scene is weird and curious. Tropical moonlight is very different from the dim sort of moonshine which we generally have in misty England: it is a bright but soft white light, throwing up all the features of the landscape with sharply defined lights and shades, as in a photograph. The arms of the slowly revolving mill, the heaps of canes, and the coral-paved yard, across which the shadows of the mill-sails flit in slow succession, are all as white as if they were strewn with freshly-fallen snow.

The wind is light and all is quiet, save for the low whirr of the mill-sails, the bell-like notes of the whistling frogs, and the droning chant of the men at the mill-house, who generally sing in this fashion as they feed the rollers with fresh canes. So the work goes on till the boilers are full and the stock of cut cane is sufficiently reduced.

At the end of the season, when the final load of cane is brought up to the yard, the people arrange for a merry-making, accompanying the cart with all the musical instruments they can muster, and making as much noise as they can. Mr. Chester thus describes the proceedings*:
—“A kind of harvest-home takes place at the end of the crop gathering upon each estate. A cart laden with the last canes is drawn by mules decorated with ribbons, and attended by a crowd of laborers, the principal women being attired in white

* “Transatlantic Sketches,” by G. J. Chester, 1869.

muslin. The mill and other estate buildings are gay with colored kerchiefs, which do duty as flags. Some ancient negro is put forward to make a speech to the planter, which he often does with considerable humor and address: then the planter replies, and a glass of falernum, a beverage compounded of rum, lime-juice and syrup, is handed round to each. Dancing then begins, and is carried on to a late hour to the sound of fiddles and tambourine. Sometimes the proceedings are varied by the introduction of a 'trash man,' *i. e.*, a figure stuffed with cane-trash and tied on the back of a mule, which is finally let loose and gallops about with his incongruous burden to the delight of the spectators."

They are a merry and light-hearted crew, these black and brown folk, and long may they continue so.

And what becomes of all the sugar and molasses that are the ultimate results of this expenditure of time, labor and money? To my surprise, I found that comparatively little of the sugar comes to England, the greater part of it is bought up for the American market—partly because it is a nearer market, but chiefly because the American merchants have a better system of payment than the English have. The planters prefer selling to Americans because the sugar is sold in the island and paid for at once. The American merchants send orders to their agents that they will buy under such and such a price, so that the seller knows exactly what he will get for each consignment, for the price is settled in the Bridgetown market.

The sugar sent to England is not sold in Bridgetown; the planter hands it over to a Barbadian merchant, who only gives him an advance of so much per hogshead. The merchant then ships and sells the sugar by auction in England, and at the end of ten or twelve months a bill is sent to the planter, giving an account of the sale, with charges for freight, commission, etc., these being sometimes so great that the balance is against the planter instead of in his favor.

I could not ascertain that there was any good reason why the English sugar merchants should not adopt the same plan as the American. The actual reason is probably that the merchants established in Barbados discourage the plan because they act as middlemen and get the extra profit which

the planter ought to receive. The control exercised by these local firms over many of the estates has had very much to do with the depreciation in the value of the estates. Money has often been advanced by the merchant firms on the condition that the sugar made on the estate should be shipped through them, and the planter then finds that the charge for freight is about twice as much as he would have paid through other agents.

Nearly all the best sugar goes to America, in the state of uncrystallized (*muscovado*) sugar, while most of that sent to England is crystallized vacuum-pan sugar, and some of it is of inferior quality, and sometimes colored with substances which are more or less deleterious, but recently more muscovado has been sent.

A large number of the estates in Barbados are owned by proprietors who reside in England, and if these proprietors would enquire into the system of selling their sugar, and insist on the American plan, or some modification of it, they would certainly reap the benefit and enhance the value of their estates. A case came to my knowledge in which an English proprietor did so act; he suspected that he was not receiving a due profit, and being a man of energy, he went over to the island and found that his estate was in debt to a certain firm, though not to a very large amount. He interviewed the firm, paid the debt, and informed them that his connection with them would thenceforth cease. He took over the management of the estate, residing partly in England and partly in Barbados, and he has his own selling-agent in Liverpool, who receives a fair and proper commission on the sugar sold. The consequence is that his income is very largely increased, and I was informed that the sugar made on his estate fetched the highest price obtained for the article in the English market during 1887.—*A. J. Jukes-Brown in The Gentleman's Magazine.*

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BARBADIAN OVERSEERS.

There is always hope for men when they begin to yearn for a better life: the thought becomes quickened within the patient, long-suffering soul. "I, too, am a man," and lo! there is

transformation, a desire for achievement, an overwhelming wish to learn—to improve—to climb.

We have repeatedly in these pages called attention to that large body of young men, who, underpaid, untaught—hopeless in all the aims of life—are, notwithstanding all these disadvantages, as things go, indispensably necessary, as overseers or book-keepers on our estates. These men live in a slough of despond from which escape is doubtful: one here and there, by dint of extra force of character, rises above his fellows, only to find himself in a position for which his previous training and education had not fitted him, and for which patient self-training, in more ways than one, can only tolerably adapt him. Without doubt, false economy, which would secure turnkeys at the cheapest rate, and leave it to fate, or Providence, from the seething mass of drudgery, to pick out a few of the best for managerial posts, has brought about a state of things that is not without its serious side, and which deserves our careful attention.

Swords are useless without skilled hands to use them; so too estates, with incapable and untrustworthy men to manage them, are useless possessions: the amateur planter, like the amateur soldier, is an utter failure, undeserving of strict confidence until time and experience have hardened him into a veteran; such experience is always dearly bought, and, even when success crowns it, the unnecessary waste and destruction are lamentable.

This question not only concerns proprietors, but also the community; the maintenance of our industrial life depends upon its solution: our exports, and indirectly our imports, depend upon the correct management of our properties. Our very social life—its stability—its progress—and the net proceeds of all our measures of improvement depend largely upon what class of men we bring in contact with our agricultural population, in the capacity of friend, adviser, and director of energy. Let those in authority—our leading agriculturists—all who hold the guiding reins at this moment, take heed to these things, consider the facts, and understand clearly what is their duty to the men they employ, for that duty does not rest there, but the chain of connection goes on until it links together, in the bond of fellowship, and world-

wide usefulness, employer and employed, owner and cow-boy. These things have the deepest significance ; they are not superficial, but strike their tap-root deep down into the very heart of things.

We must familiarize ourselves with the problems of life which surround us, it will not do to consider them in the abstract forever ; nature forbids it : for when we comfortably console ourselves that these things are far off, and will only concern the men of the future, nature brings the whole concrete trouble before us ; stirs up some "overseer" to utter his cry of despair, and makes us feel that unless we bestir ourselves we shall have no good men to replace our old planters, or to recruit their ranks. An agricultural country must not only breed men with agricultural instincts, but it must foster those instincts ; if it repress them and do not recognize them, its agricultural supremacy will ultimately wane from want of men to maintain it.

Death now and again leaves a blank in the planter ranks ; a well-known figure disappears ; a voice of authority is hushed ; the place is filled by a make-shift ; and that is the end of it : but the thought comes home to us that our grand old planter race—the manly, thoughtful men who converted limestone into a garden, and gave honest agricultural fame to Barbados, are dying out—leaving their places to inferior men, too often unworthy of the name of Elijah.

The planter race, with all its inherited instincts, still exists amongst us, the material is all there, ready for improvement, eager for employment ; but, strange to say, in an agricultural community where every institution is based and buttressed by agriculture, these instincts are discouraged, chilled by neglect, and, by means of costly systems of education, led into new channels. Our young talent, winning its scholarships—the money for which plodding agriculture supplies—goes to the University, becomes professional, may even win professorial honors, and obtain a fair share of renown—all to the glory but little to the benefit of Barbados. This is all as it should be ; it is the flower and fruit of our educational system : honors won by our young men are our honors. We sent them forth equipped for the enterprise, and feel a natural pride in their success : we would not have it

otherwise. But while we rejoice in the fruit we must not forget the requirements of the root of the tree. The neglected overseer class forms no inconsiderable portion of the valuable sub-soil in which our educational tree finds substance for its tap root ; but there is no greater difference between the flower and the gnarled and dirty root, than there is between the scholarly Harrisonian, and the poor book-keeper, who, with his smattering of the three R's, is unfitted for his humble post. And yet if we come to consider essentials we must admit the one to be an absolute want, while the other, at its best, is to us now but a priceless ornament. Let us remember that the overseers also are men, and encourage them accordingly ; honestly stretching out the helpful hand to all who deserve it.

But we cannot blind ourselves to certain facts ; the primary school cannot supply us with the right class of men, we must look to the higher schools. As we know, the outflow from them is in all directions save the agricultural : and what wonder ? Can any young man be expected to become a drudge upon a plantation, upon the magnificent salary of \$8 to \$10 per month—to voluntarily become a slavey of slaveys without hope—to spend his days grinding away in the same rut, cramped in mind and body, and with what prospect ? A possible management, held on no tenure whatever, not even the tenure of merit—a breath gives it and a breath takes it away. Surely we cannot expect the better class of young men to immolate themselves on the altar of agriculture for the benefit of their country, or to enlist in the forlorn band whose utmost toil and energy can only lead to the acquisition of the most uncertain of offices. Reformation is necessary, and a better system must be provided. We want real agriculturists—men who know their work, and men, too, of thought and feeling, capable of sympathizing with and influencing the people whom they are appointed to supervise—real leaders of men, winning the confidence of their people and not sham leaders, ignorant of their duties, and perpetually calling upon the magistrate to settle their trivial disputes. There is even now, or soon again to be, we hope, a Bill before the Legislature to promote the foundation of a Science Department at the Government Laboratory, for the

training of lads in agriculture and general science, "the benefit of which may be enjoyed by any boy in the Island." It is a comprehensive scheme of scientific education, one which "would not only be of the greatest practical value to the planter, but it would also be so to the boys who in the future intend to become doctors, engineers, chemists, scientists."

Scientific education is becoming more and more an agricultural necessity. It is a mere matter of time. The scientific department must come just as surely as the experiments inaugurated at Dodds must be pursued on a very much larger scale; knowledge will increase more and more: but will it ever be bound to the soil? Will it ever reach the soil directly in the person of the manager, and not always indirectly through the chemist? How many of these trained lads can we expect willingly to turn their attention to agriculture, unless agriculture can in turn offer them some inducement, some foothold, some certainty in life. A management obtained under no known system of promotion, and held by no certain tenure, not even, we repeat, that of merit, will not attract lads of talent who have passed through a scientific school; they will naturally gravitate elsewhere, and go to the doctors, the chemists, the scientists.

If we would maintain our agricultural supremacy we must induce the right sort of men to enter the agricultural ranks; our present want of system compels our best men to seek other employments: but those interested in maintaining the value of property must recognize the importance of bringing the soil and the right men together, and take their measures accordingly. Scientific—that is to say, accurate knowledge becomes daily more and more of a necessity.

The make-shift system—the cheap system of expediency—has created in our midst a numerous class of overseers, incapable, for the most part, of improvement, many of them being too old, and who will probably continue to be nothing else than turnkeys for the rest of their days. They are the outcome of a pernicious system: but amongst these book-keepers there is a considerable number of young men of more than average ability, really good keepers of estate books—vigilant, prompt, and desirous to excel; the eye of the manager should be on these men; he should be ready to note

their virtues and impart to them his experience. Chance should not determine their fate, but every employer should feel himself morally responsible for their welfare and advancement. Unless some such sense of responsibility becomes active in the minds of employers we know not how the talent of the island, furbished up as it is to be in the scientific school, is to be brought to bear on the soil or kept in contact with it. Fortunately interest and moral duty here hold hands. A great man once said that "it is best to confide in one's self, and be something of worth and value," and we would say to every overseer amongst us, try and be something of worth and value. You may not receive full recognition, but your force of character, your manly honesty and integrity will make you respected and respectable, enable you to fulfil your duties as a man and to accept cheerfully your appointed place, even as a gift from the hands of Providence, and thus, by your own acts, give dignity to your humble employment. Some day the faithful servant will be missed: it is well when a man is missed.—*Barbados Agricultural Gazette.*

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CHEAPER SUGAR.

The sugar trade has been the center of more than usual interest this week, as a result of the going into effect of the new tariff regulations with respect to this article of food. On April 1, all sugars below No. 16 Dutch standard were admitted free of duty, and the result of this reduction of duties was shown in a reduction in price of from $1\frac{3}{4}$ c. to $2\frac{1}{4}$ c., the former on refined and the latter on raw sugars. Above the No. 16 standard, the duty is $\frac{1}{2}$ c. per pound, a reduction of 1c. to $1\frac{1}{2}$ c. per pound on previous tariff rates. On March 31, raw centrifugals sold at 5.74c., and on the next day at 3.53c., a reduction of 2.21c. per pound. This is equal to the amount of duty on this grade. The price of refined sugar did not show so large a decrease, selling, as it did April 1, at 4.2-5c., against $6\frac{1}{4}$ c. on March 31. This is said to have been due to the active demand for refined from all sources, growing out of the virtual famine in supplies from duty-paid sugars and the inability of dealers to at once supply the demand. These

changes refer, of course, to sugar at wholesale. The extent of the effect on the price to actual consumers has been the result of some speculation. The time elapsing since the change took place has not been sufficient to allow of the fixing exactly of the extent of saving the average consumer may make under the new rate. Reports at hand indicate that some dealers have either failed to make any reduction at all, or, if they have made changes, the net differences in prices is not proportionately as great as that shown in wholesale rates. The probabilities are that with the lapse of time and the education of the consumer there will be a general shrinkage in prices to a parity with the decline at wholesale.

There were several interesting features attending the change from a duty paid to a free sugar basis. For a considerable time previous to April 1 there was no sugar made from duty-paid sugar for domestic consumption. Considerable refined was also exported, and the result was that the visible supply of refined was heavily reduced. Dealers bought sparingly, and the result was that the amount of refined made from duty-paid sugar carried over on April 1 was very small. No doubt some of the unwillingness of retailers to immediately reduce retail quotations was due to their effort to realize on the stock of old sugar. But an actual reduction of 2c. a pound is reported by some grocers. To allow of a sufficient supply of sugar being ready for consumption on April 1 the Treasury Department has allowed refineries to manufacture refined in bond, and for a month past this has been virtually the only kind of sugar made for domestic consumption. As none of this bonded sugar was available for consumption before midnight on March 31, and the probabilities favored a large demand for refined grades thenceforward, the result has been a large accumulation of sugar in warehouse in charge of collectors of customs. It has been estimated that 125,000 barrels were released from bond at Chicago on April 1, and at St. Louis the amount released is placed at 50,000 barrels. A Wheeling, W. Va., dispatch places the amount of sugar held there at 2,000,000 pounds, and the total amount of refined sugar distributed to the trade on April 1 is placed by trade authorities at 900,000 barrels.

The outlook is for a large gain in consumption. All lines

of trade in which sugar is a factor, such as confectionery manufacturing, brewing, canning and preserving, promise to use increased quantities. The cheapening in price may also give rise to enlarged uses outside of the above-mentioned industries. The low price of sugar in England for many years has had an important effect upon the manufacture of the production of sweets. Mr. Havemeyer is quoted as follows :

The demand for sugar under the new conditions is bound to be heavy, though I do not think there will be any such immediate reduction in price as some have supposed. It will take some time to distribute the cheaper sugars, and it may be a month before the full effect of the reduction is felt. One of the consequences of the reduction of the duty and lessening of price will be the establishment of new industries in this country. For instance, we have no large manufactory of jam here, while in England they manufacture upward of 100,000 tons a year. It is probable that such an industry will shortly be started here, because we can now enter into competition with the English. My observation is that in countries where they have free sugar the consumption is much larger than in others. The consumption in England averages 70 pounds per capita, while here it is only 55 pounds. Again, free sugar countries use a much greater proportion of the higher grade sugars. The consumption here is likely to be increased by the use of sugar instead of glucose by brewers. Candies will be cheaper, and that one item alone will be the means of increasing the sale of sugars. Free sugar will prove a great benefit to this country in more ways than one.

There has been some talk of a combination, including the American Sugar Refining Company and Claus Spreckels, to maintain rates above those popularly expected to rule, but this has been denied by some of those concerned. Regarding wholesale prices Messrs. Willett & Gray say that refiners can now make profits of $\frac{3}{4}$ c. per pound from the refining business without interference from abroad. Heretofore they could make profits of 1c. per pound and over without such interference. Two thousand tons of German granulated sugars have already been imported into the United States, and whenever refiner's profits exceed $\frac{3}{4}$ c. per pound more will come. At $4\frac{1}{4}$ c. for granulated refiners are making a profit of 1-5c. per pound at present market value of raws, which prevents importation of foreign refined.

A dispatch from San Francisco to *Bradstreet's* yesterday reports the features of the Pacific coast trade during the week to have been the movement of sugar. March arrivals of Hawaiian sugar were very heavy, and as, according to contract, the coast refiners were forced to take all such sugar offered

at high rates, stocks in first hands are very large. The talk of an agreement to maintain prices is reiterated, and the fact that granulated only dropped $\frac{3}{4}$ c. per pound on April 1 lends color to the report.—*Bradstreet's*.

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GERMANY AND THE SUGAR BOUNTIES.

On the 8th and 9th ult., the debate on the third reading of the new German Sugar Duties Bill was opened and brought to a termination so far as the Reichstag is concerned.

The final result of the discussion and voting is as follows:—

The tax upon the raw material is abolished, and in place of the double tax—one on the beets and the other on the sugar passing into consumption—the latter alone remains, the rate being reduced to 18 marks per metric centner (100 kilos.) In place of the premiums, varying according to the skill and good management of the manufacturer, which were secured under the old system, there are to be granted on exported sugar for a period (termed the *Uebergangs*, or transition period) of five years, commencing from 1892-93, open or definite premiums as follows:—On raw sugar, 1.25; on refined, 2.00; and on granulated, 1.65 marks per metric centner (100 kilos.) for the first three years of the period, and for the remaining two years,—1, 1.75, and 1.40 marks respectively. The import duty is fixed at 36 marks per metric centner.

For the year 1891-92, the old legislation, which is as follows, remains in force:—Tax on the beets, 80 pfennig per metric centner; tax on sugar passing into consumption, 18 marks per metric centner.

The new law now has to receive the sanction of the Bundesrath (Federal Council) and of the Emperor; but after what fell from the lips of the Chancellor there is little probability of any alteration being made by these, and we are therefore now in face of a *fait accompli*, the definite movement towards abolition at no very distant date of the premiums in Germany. This has been and remains the clearly avowed object of the German Government; much may happen before 1896-97, but the events and results of every campaign, with all the factors which condition the latter, must be carefully studied during

the next few years by all who are concerned for the abolition of these bounties.

As some assistance in this study, we have translated a considerable portion of the speech of Dr. Witte, which has attracted attention in France. This deputy placed on record a proposal for the immediate and definite abolition of premiums, which however could not be carried, as the feeling in favor of letting down the manufacturers gently was so strong, and further, the Chancellor had declared that the object of this transition period was to give neighboring States the opportunity of following suit, though the Confederate Governments were not of opinion that the German sugar industry would not be able to hold its own, unless their competitors abolished their premiums. The following is the speech referred to :—

Count Stolberg has declared that we are actuated by ill-will towards the sugar industry, that our proposal (to strike out the paragraph granting an open bounty) was made under a feeling of hostility, and that by it we should materially injure those sugar manufacturers as were working under less favorable conditions than others. I really did not think, after the position which I have adopted during the past twelve years in regard to the sugar question, that I should have had to defend myself against such a reproach. I have been the most accommodating friend of the real interests of the sugar industry in this house, although up to now with but little success, and at the present moment scarcely any clear-minded man can be in doubt that, if my proposals and the facts which, based on the most careful calculations, I have for ten years adduced,—in other words, the resolutions which I have brought forward in connection with those facts, had been adopted by the Federal Governments, the position of the sugar industry in regard to legislation would have been a much more favorable one to-day than it is. In this respect I fully agree with the Imperial Chancellor that if no result should follow from the legislative labors of the present year, you will find yourselves next year in a much more unfavorable position than you do to-day with this wrong defence of a false position.

One thing I can agree with. In the same way as the effect

of the bounty has not been, and could not be, equal in the case of all the factories, the effect of the cessation of the bounty and the abolition of the tax on the raw material will certainly not be the same in the case of all. But this is just what has been the unsound and defective result of the legislation hitherto in force, that during a long course of years it has produced, and must necessarily produce, an unsound extension of the beet cultivation and sugar manufacture in Germany. Hence there can be no doubt that if such a radical alteration in the legislation as that now proposed should come into force, then a number—the exact figure I cannot of course specify—of sugar factories which have sprung up in an unsound and incorrect manner must suffer by it. Such things, however, which are a natural consequence of the protectionist system of taxation embodied in the hitherto existing fiscal regulations with regard to sugar, you will not be able to avoid in the case of any similarly situated industry if you undertake a rational and sound revision of the law relating to it.

There has been, both in the preceding discussion and that of to-day, very special regard paid to competition with other countries and to the circumstances which would arise with regard to it, if we abolish the tax on the raw material together with the bounty, while the bounties are maintained in other countries for a longer or shorter period. I have, on other occasions, already had the opportunity of putting a just estimate on this cause of anxiety. In the preceding session, one of the speakers threatened us with the extraordinary American competition, and with the great anxiety that we must feel lest our market in that quarter should be restricted in consequence of the regulations relating to taxation. At the time I was only able to put in a temporary protest, but now I must briefly allude to the matter. The whole story about American sugar production, about which so much noise has been made—and really in quarters where the facts ought to be better known than seems to be the case, judging from the utterances which have been published—the whole affair of the American beet sugar production is a thing that is yet in the clouds; there is as good as nothing practically existing. In spite of all the efforts that have been made, and all the premiums and protective duties that have been granted with

the idea of calling into existence the cultivation of beets in America, it only exists on paper. At the present moment there are still only three beet sugar factories in America, which lead a precarious existence.

This is an incontestable fact, and I am fortunately in a position to give you some details from a writer, formerly a member of this House, a weathercock in politics, but to be depended on in matters of national economy. In a late number of the *Deutsche Wochenblatt*, Professor Paasche-Marburg has expressed his views on the position of Germany as regards other sugar-producing countries. With respect to America, he says:—

“Even the great *Verein für die Rubenzuckerindustrie des Deutschen Reichs*, in its appeal to the Imperial Chancellor, of the 7th November, 1890, starts out from the position that the North American agriculturists can cultivate sugar beets with success.”

You may suppose from this what will be the tenor of the statements addressed to the Imperial Chancellor the various Governments, even by men so thoroughly at home in the question.

“For years the American journals have teemed with the most hopeful reports. . . . and up to now the results of the efforts of ten years are totally unimportant.”

Then the three factories, of which I have spoken, are brought in, and further on mention is made as follows of the two cents' bounty of the McKinley Bill:—

“The bounty of two cents, given by the McKinley Bill, is anyway not, as the address of the *Verein für Rubenzuckerindustrie* would make out, an enormous premium now offered to the agriculturists—it is neither more or less than a substitute for the protective duty which is being taken off, and actually has the effect of making the position of the American producers worse.”

This, then, is the bugbear of American competition, which does not frighten me in the least. The article in question proceeds then to discuss, in a very interesting and instructive manner, the position of the sugar industry in tropical countries.

The threat, that colonial cane sugar would at no distant

date make an end of us, is, as we know, also one of those things which at the present juncture is being actively brought into publicity. In this article it is fully shown what are the circumstances connected with cane sugar and its production in the Colonies, how the climate, the cost of labor, and all other matters connected therewith, make it utterly improbable that any such enormous mass of sugar could come from that quarter to swamp the European market.

But France is also treated of, and in this connection we are told, that in Germany the average yield of sugar per hectare has amounted to 34·6 metric centners, whilst in France it has been 27·5.*

The conclusion is characteristic. Professor Paasche, after devoting ten columns to showing that Germany, as he says himself, is one of the best sugar-producing countries in the world, and demonstrating how and in what manner the position of Germany is a permanently leading one in the world's market, he says:—

“From what has been stated we might come to the conclusion that Germany can afford to dispense with bounties. But that is not the fact; we ought to leave the industry the small bounty which it has, in order that it may be able to lead a still more healthy existence than has hitherto been the case.”

Now I call this a regular professorial conclusion. The only conclusion that could be drawn from the statements in question was this: away with the bounties, we have not the least need of them!

I shall not go further into detail respecting France; in the statement which I have brought in for distribution among the members of the Reichstag, the figures in which have up to now not been disputed, still less confuted, by anyone, everything that can be said on the sugar question with respect to the position of Germany as regards France has been set out in detail. According to those figures and statements Germany is so far in advance, in regard to the production of sugar, that if the premiums were abolished France would still produce her bounty-fed sugar at a greater cost, and consequently would bring it into the open market at a higher price than what we are in a position to do in Germany.

*Equivalent to about 27¼ cwts., and 21 3-5ths respectively.

Dr. Witte then proceeded to deal with the question of allowing a period of eight, five or three years to elapse before the bounties were entirely done away with, and argued that the position of the German factories would be the same after any of these periods as now, and therefore economically unsound, and that not until the premiums were abolished would the prices in the open market be placed on a clear and sound basis, and, as he believed, with an upward tendency. And as regarded the figures adduced by Furst Hatzfeldt showing that France, since 1887, had increased her production and export in a greater ratio than Germany, he showed that Germany could not possibly continue to advance at the same rate as was feasible in a country where the beet sugar industry had fallen so low as it had in France, but let them wait another five years, and the results would be totally different. To the further insinuation of Furst Hatzfeldt, that the sugar which Germany placed on the London market was only a part of what was sold there, Dr. Witte replied: "Yes, but the fact, that Germany supplies 45 per cent. of the total quantity, of itself gives her, under any circumstances, the leading position."

Dr. Witte concluded by demanding an answer to his question, what the German sugar industry would do in the interval accorded to it, and declared that if, as he believed, no other answer could be given than that it would do just as it is doing now, be the term eight, five or three years, then there was one reason more for the immediate abolition of the premiums, to prevent the continuance of the unsound element which they had introduced into the national economy. He, therefore, appealed to the Reichstag to reject the clause which proposed to grant a fixed open premium for a limited term of years.

The *Journal des Fabricants de Sucre* has the following remarks as comment on the legislation adopted:

"The scheme may be summed up as a combination based upon the strong position of the German industry, and directed towards increasing the revenue derived from the tax on sugar, whilst, at the same time, leading the rivals of Germany by a roundabout way to the end successfully pursued by the London Conference.

"It remains to be seen whether the countries which Germany has very nearly ruined by her exaggerated bounty-fed production, will be in a position to dispense with their weapons, and to agree, without danger to their industries, to the pacific programme which it is sought to propose to them."

—*The Sugar Cane.*

CONSTITUENTS OF SOILS.

(New York Agricultural Experiment Station Bulletin.)

GENERAL COMPOSITION AND ORIGIN OF SOILS.—Of the fourteen elements necessary to perfect plant growth, ten come exclusively from the soil, as previously indicated. These have already been described, and we do not need to give further attention to them in this place. The soil-derived elements, though forming on the average only about five per cent. of the whole vegetable kingdom, are of the utmost interest and importance to the farmer; for, while the atmosphere is entirely beyond his control, he can, through the medium of the soil, influence the amount of vegetable production.

Soils consist of decomposed rocks, mixed in varying proportions with organic matter called humus, formed by the decay of animal and vegetable substances. The principal part of the soil was once solid rock, and the first step toward the formation of soil was the powdering of the rock. The conversion of rocks into soil has been accomplished by means of various agencies, such as heat and frosts, moving water and ice, chemical action of air and water, and the influence of animal and vegetable life. The value of a soil for agricultural purposes depends largely upon the original material from which it was made, and upon the state of fineness to which it has been reduced.

FOOD CONSTITUENTS AND MECHANICAL CONSTITUENTS OF SOILS.—The constituents of soils can be divided into two general classes, which we will call food constituents and mechanical constituents.

Food constituents include the ten soil-derived elements which are essential to the development of plants. They may be divided into two kinds, available and unavailable food constituents.

The mechanical constituents of the soil include clay, sand and humus. These act as a mechanical support to plants and as indirect fertilizers. Clay has the power of absorbing and retaining a large amount of water, thus preserving a sufficient amount of water in the soil. Clay has the power also of holding ammonia and some mineral salts and again giving

them up to plants. Clay, therefore, acts on the available elements of the soil as a sort of regulating material, retaining or yielding them by turns as the earth passes from a state of drought to one of excessive humidity. Sand serves, when mixed with clay, to diminish its compactness, and makes it more porous and permeable to the air.

Humus is the organic matter in the soil formed by the decay of animal and vegetable matter. It is brown or black in appearance; leaf-mold, swamp-muck and peat are varieties of humus, differing in appearance according to the conditions of their origin and formation. The decay of roots, the plowing under of sod and stubble, and the application of manure cause the formation of humus in the depths of the soil. The composition of humus is somewhat doubtful. It is probably a variable mixture of several substances. Humus is extremely valuable as an indirect fertilizer, for the following reasons: First, humus absorbs water much more extensively than any other ingredient of the soil. Second, humus aids in the decomposition of the mineral matters of the soil, changing unavailable into available plant food. Third, humus fixes ammonia in the soil, so as to prevent it being carried off by the rains; it afterwards gives up this ammonia to plants. Humus is, therefore, a very desirable constituent of the soil, and the beneficial effects of stable manure and green manures are doubtless due, in some degree, to the abundance of humus which they furnish to the soil.

ANALYSIS OF SOILS.

It is ordinarily supposed that a chemist has only to make an analysis of a soil in order to tell just what the soil needs and what elements should be added to make it most productive. What chemical analysis does actually tell is what elements are present in the soil and in what quantities they are present; it does not tell whether the elements are available as plant food, and it is just this point which one should know in order to apply to a soil what is needed. Most agricultural chemists to-day do not place much confidence in the chemical analysis of a soil to find out its needs.

How can we find out what elements of fertility a soil needs to make it most productive? This Station and many other

Experiment Stations have been trying to answer the question by letting plants analyze the soil. This is done by laying out several plots of ground; we fertilize one with potash compounds alone, one with nitrogen compounds alone, and one with phosphates alone. This is varied by introducing on other plots combinations of any two or three of the above constituents. For comparison, some plots are left unfertilized. From such experiments, carefully conducted, conclusions can be drawn as to what element or elements are lacking in the soil for the successful production of any particular crop. Such experiments can readily be carried out by any farmer upon his own land, especially under the direction of some one who is acquainted with such methods of experimenting.

RELATIONS OF PLANTS AND SOILS.

The general offices which the soil fulfils in its relation to plants are of three kinds. First, the soil acts as a mechanical support for plants; the roots of the plant penetrate the soil downwards and sideways, and brace the plant firmly to its upright position. Second, the soil furnishes directly all the soil-derived elements used by the plant, and is thus immediately connected with the nutrition of plants. In addition, the soil serves as a medium for conveying to the plant a considerable portion of the air-derived elements. Third, the soil contributes to the development of plants by modifying and storing the heat of the sun, by regulating supplies of food, and, in various ways, by securing those conditions which must be present and unite to produce the fully developed plant.

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BEEF SUGAR INQUIRIES ANSWERED.

Please give us some information on the following points, and greatly oblige:

1. What duty is levied on imported German or French beet sugar?
2. Is it likely that, by reason of market fluctuations, there may be any refined sugar (granulated) imported from England or Scotland?

3. What number covers (under D. S. system) granulated sugar?

4. How many degrees apart are the D. S. numbers, as near as they may be ascertained by color?

5. In what shape is beet refined imported?

6. What is the amount of bounty per pound paid to the German sending it to the United States?

7. From whence come the low grades of yellows for grocers' use, which are beginning to come to the United States?

1. All sugars above No. 16 Dutch standard in color shall pay a duty of one-half cent per pound, provided that all sugars above No. 16 Dutch standard in color shall pay one-tenth of one cent per pound in addition to the rate herein provided for, when exported from, or the product of any country when and so long as such country pays, or shall hereafter pay, directly or indirectly, a bounty on the exportation of any such sugar which may be included in this grade which is greater than is paid on raw sugars of a lower saccharine strength; and on sugars after being refined, when tintured, colored, or in any way adulterated, five cents per pound.

2. It is possible.

3. None.

4. There is no way to determine.

5. In bags of 225 pounds each.

6. The present bounty, or profit, accruing to manufacturers is conceded to be about 2.12 marks per 100 kilograms. During the last year it is estimated that the German government suffered a net loss of 16,000,000 marks from this source. The new bill in relation to the sugar industry was under discussion in the Reichstag the other day. The Secretary of the Treasury, in the course of a speech, admitted that from a financial point of view the complete elimination of the bounty clause from the bill would be altogether advantageous. But, he said, such a step would not in the least accord with the policy of the government at this time. He expressed the belief that the German sugar industry would be able to compete successfully with the industry of foreign countries, even if the bounties were entirely cut off.

7. From the West India Islands. Molasses sugar has sold recently in this market at 3½ cents and muscovado at 3¾ to

3 $\frac{5}{8}$ cents for grocers' use. There is very little yellow sugar coming to this port which would be acceptable for consumptive purposes without refining.—*Shipping Gazette, N. Y.*

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TOMATO TESTS.—A COMPARISON OF YIELDS OF SEVERAL VARIETIES GROWN BY DIFFERENT METHODS.

(New York Agricultural Experiment Station Bulletin.)

In these tests, seven plants each of nineteen of the newer varieties of tomatoes were used. The plants were set in a young vineyard that had been top-dressed with bone meal at the rate of two hundred pounds per acre, the soil being in a good state of tilth. In setting the plants, each row was run east and west. A wire trellis was then run north and south, to which the eastern plant of each variety was trained. The next plant in each row was trimmed at frequent intervals, thus allowing the sunlight to penetrate to the soil and also reach every fruit. The three following plants were allowed to grow at will. The sixth plant was trained to a stake, being tied up as required, and the extreme western plant was trained to a wire trellis. The trimmed plants, in almost every case, gave the first ripe fruits, but both the west trellis and staked plants ripened ten fruits as early as did the trimmed plants.

It will be noticed also that both the west trellis and staked plants of every variety yielded a very small crop. This is accounted for by the fact of there being a heavy clay knoll running through the vineyard. While this knoll was well manured the previous year, and was in good tilth when the plants were set, the rains of the early summer caused it to become very heavy and to bake through the hot season. This baking or drying of the soil may have had the effect of hastening the ripening of the fruits on the staked and west trellis plants. During the fruiting season there was a very heavy rainfall, there being for the months of August and September over ten inches, notwithstanding which there was very little of the tomato rot; and the only effect of the frequent showers was to retard the ripening of the fruits. In fact it has been generally noticed that the tomato ripened slowly through this sec-

tion of the state. By referring to the table it will be seen that in every case but one the yield of ripe fruit was smaller than the yield of green fruit, making the yield of ripe tomatoes fall below the average. In this immediate vicinity the green fruit sold for about as much as the midsummer and late ripe ones, causing no little loss to the grower. It will also be noticed that the plants allowed to grow at will gave a larger yield per plant than any others, but the fruit was much later in ripening, in fact the greater portion of green fruits were picked from those plants.

The fruits on plants tied to trellis or stake were, on an average, of a larger size and more symmetrical. For a small garden either system will be found preferable to allowing the vines to grow at will, but in commercial growing the advantages are not enough to pay. The Chemin, Early Ruby and Cleveland's No. 115 proved the best of the early varieties. Matchless, McCullom's and Cleveland's No. 57 giving the largest yield. Lest anyone should be deterred from planting a quantity of tomatoes by the small yield obtained here, it will be well to state that this locality is not considered equal to other parts of the state as a tomato growing section.

[A table following the above shows the yield of the varieties, one plant each, which varied from 35 ripe tomatoes weighing 14 lb, to 80 ripe tomatoes weighing 26 lb. 2 oz.]

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WHAT KIND OF SUGAR SHOULD WE MAKE UNDER THE PRESENT TARIFF—HIGH GRADE FOR CONSUMPTION OR LOW GRADE FOR REFINING?

[A paper by Mr. D. D. Colcock, read before the Louisiana Sugar Planters' Association, June 11, 1891.]

In considering this question the first principle we must lay down is that the value of our sugar to the refiner is determined by the price at which he (the refiner) can lay his supply in store; I mean the supply of foreign sugar. Under the old law of 96 deg. test, sugar paid a duty of 2.24 cents per pound. Under the new law such sugar is free. The average duty paid, however, was on all grades imported about 2 cents per pound.

Assuming the average of vacuum pan sugar to be above 90 deg., which is fair, the present bounty of 2 cents per pound on plantation sugar equalizes the conditions of old and new tariff. But beyond this bounty, there is a duty of 0.5 cent per pound levied on sugar imported, should the test run above 16 D. S. In other words the refining industry is protected to the extent of $\frac{1}{2}$ cent a pound. This brings us to the question of the value of our sugar to the consumer. Clearly that value must at the lowest calculation equal the value to the refiner plus the $\frac{1}{2}$ cent protection on all sugar, presenting to the consumer the same appearance as the refiner's product. Such sugars are the plantation granulated, choice white, choice yellows, and choice seconds. The only difference in the two products, aside from skill in manufacture, is that the refiner uses bone black as his bleaching agent, while the planter has recourse to sulphurous acid gas.

On the basis of quotations ruling to-day the margin of the refiner is the difference between 96 degrees, at $3\frac{1}{4}$ cents net cash, and granulated $4\frac{1}{2}$ cents, less 2 per cent., say 4.04 cents or about $4\frac{1}{2}$ cents, a margin quite reasonable and one which it would be fair to consider a minimum. To go above this margin might invite the importation of foreign refined. To go below it would leave too little profit to the American S. R. Co. While the former is merely contingent, the latter is actual; we may therefore accept as true $4\frac{1}{2}$ cents as the normal difference between the price of 96 degrees test foreign sugar and American standard granulated.

In the distribution of plantation sugar there is absorbed by "middle men" from $\frac{1}{2}$ c. to $\frac{3}{4}$ c., and intrinsic differences probably absorb $\frac{1}{4}$ c. more, so that the planter's margin, instead of being $4\frac{1}{2}$ c., is nearer $3\frac{3}{4}$ c., sometimes more, but with the ordinary winter demand it should never be less.

This increment, $\frac{3}{4}$ c., then, is what should determine planters in their manipulation of cane juice. Under conditions ruling in the past this increment would seem to warrant the production on plantations of high grade sugar, and to the writer's mind is conclusive.

To go beyond the region of facts may not be strictly permissible in discussing topics before your body, but where reasonable suppositions offer the basis of argument, deductions

from them have a real value and should be given due weight. Should the effect of the bounty be a degraded product, there can be no doubt that its unpopularity would be heavily accentuated. Where it is now perhaps only objected to, it would then be simply damned. So much for the sentimental side. On the practical side, the immediate effect of debasing the product would be, to drive away the consumer and to leave the market entirely in the hands of the refiner. There is no doubt whatever as to the result in this case. Before the Sugar Refining Company was born the competition between the two local refineries here was sharp, and this led to very good prices being paid for the refining grades of open kettle sugar. These refineries, however, made a combination on the purchasing side; pooled their purchases, employed one buyer in common—call it what you like, and thereafter took in the refining grades at a reduced price. Now that the combination has been made for both buying and selling, can there remain a doubt in the mind of any rational being that in the absence of a demand from the consumer, the refiner would cut purchase prices to suit himself? No. The question would only be how deep to cut and yet leave you all enough to keep alive upon.

The argument upon facts, therefore induces me to advise the production of high grade sugar. The argument upon reasonable suppositions adds weight thereto, and I therefore submit them with confidence to your consideration, trusting that your good sense will enable you to see which way your interest lies, and that this evening's time not be regarded as idly wasted.

In the *Journal des Fabricants de Sucre* of 27th May, the same discussion is under review: "*Should we Make Raw Sugar or White Sugar?*" The opinions expressed are quoted below.

If the manufacturers supply raw sugar they will be at the mercy of the refiners, who will impose very hard conditions upon them in the purchase of their goods, such as deduction for glucose, an unknown quantity, unless relying upon the endless difficulties arising from analyses. To make raw sugars the fabricants must be organized commercially, so as

to be able to export, thus escaping the exactions of the refiners if pushed too hard. This organization they lack. The French fabricant has no commercial spirit.

The proof is that we do not enter the market of the United States where such an enormous business is done. In that market we might compete successfully with the German and Austrian sugars which have now the entire market to themselves, owing to our lack of enterprise. Indeed, just now North America has but one buyer—the sugar trust. This buyer is fickle. One day he buys; the next day he disappears suddenly. With such a client the usual commercial modes do not satisfy. Sellers must combine; come to an understanding and put their affairs in the hands of a single agent. This agent should always have in hand 4,000 to 6,000 tons, so that upon receipt of an offer he might be ready to respond instantaneously.

With our present system when a large offer is made we have to hunt up Tom, Dick and Harry, see if each one will supply a lot or two, haggle over the fractions, and meanwhile the sale is made by some Dutchman. If therefore we expect to dispose of 700,000 or 800,000 tons of raw sugar we must first organize commercially to export, if not, look out for the refiner.

If, however, we do not make the 700,000 or 800,000 tons of raw, we must make about that quantity of white. This off white stuff would, however, block the market, since being unfit for direct consumption, it will not do for export to England or America either. Decidedly, we would have to keep it on hand and so the refiner would, after all, have us at his mercy and be able to dictate prices.

Would not the wisest course to pursue be, to make actually white "choice white" sugars, well packed and well cared for. Such sugar would find ready market in England and also many buyers in France, among the confectioners and grocers, and in the wine trade. Moreover, the French sugar houses are already fitted up to make two-thirds of their product into choice whites. Very little care would be necessary to turn out fine crystals, comparable with the German granulated, which finds, so to speak, an unlimited demand in Great Britain.

It is high time to organize, to stimulate the commercial spirit which appears so strangely sluggish. If this inertia has not been seriously damaging hitherto by reason of our limited production, it is certain that when we do make enough to compel a large exportation our condition will be unavoidably critical in the extreme.—*Louisiana Planter.*

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FRUIT CULTURE IN JAMAICA.

Owners of lands suitable for fruit culture in the State of Veracruz, and in other parts of the country, will be interested to learn of the success of a large American enterprise in the Island of Jamaica, near Port Antonio. The Boston Fruit Company have bought a number of old sugar plantations, and leased others. The land has been plowed and banana trees set out. The finest of these estates is Golden Vale a plantation of some 3500 acres, which lies about nine miles from Port Antonio, on the Rio Grande, the second river in size on the island. Much of this land is inaccessible for cultivation, but before the abolition of slavery in 1838, 300 slaves were employed on it in the production of sugar and rum; and the stone ruins of the residence, the sugar and still houses, and of other buildings, remain to testify to the magnificent scale upon which it was conducted. It is now owned by the fruit company, who have 250 acres of the best land along the river bottom laid out in rows of banana trees, which are cultivated on scientific principles. The tree grows rapidly from a young shoot and bears fruit from nine to fifteen months; each tree produces one bunch the number of bananas in a bunch depending upon the richness of the soil. After the bunch is picked, the tree is cut down and a shoot allowed to grow up from the roots. After bearing for five years, the soil becomes exhausted and the cattle are turned into the field and allowed to eat up the young trees as they sprout. This effectually destroys the roots, and when the field has been allowed to lie fallow for a year, frequented by the cattle, it is ready for ploughing and a new set of banana trees. If the old roots are left to bear in the same soil, the size of the bunch produced

by each succeeding shoot dwindles rapidly, and the banana also decreases in size and quality. The fruit company now own a line of steamers, bought in England, and send nearly every week a cargo of fruit to Boston. The company also own a number of small sailing craft which ply along the coast, bringing loads of bananas to Port Antonio. The company's manager is now raising cucumbers, tomatoes, etc., for the American market in early spring. The industry above described would be easily introduced along the Gulf coast of this country, and the returns are certain to be profitable.—*Mexican Financier.*

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*RAMIE.—A NEW INDUSTRY ADMIRABLY ADAPTED
TO OUR SOIL AND CLIMATE.*

The Ramie Fibre Machine, (exhibited by W. H. Murray, State Superintendent of Ramie Culture, at the State Fair), for separating the fibre by the dry process, opens up immense possibilities for California.

The ramie plant, known to botanists by the name of *Boehmeria*, a gigantic, stingless nettle, is indigenous to Java and China, where its fibre has been used in constructing fabrics for hundreds of years.

France, Germany and England depend on those countries for ramie fibre, and from it they manufacture a great variety of fabrics that are sold for linens and silks, laces, handkerchiefs, lace curtains, white goods, toweling, table damasks, table covers in colors, reps, plush velvets, carpets, and a great variety of similar goods. It is used in the manufacture of silk dress goods, the warp partly or entirely composed of ramie fibre adding to the strength and body of the goods, without depreciating their beauty, with a saving of thirty to sixty per cent. of the silk otherwise required.

Ramie fibre receives the most delicate shades, as well as the most brilliant dyes, retaining them more tenaciously than any other fabric; it also has the quality of being very repugnant to moths, and is never eaten by them. The tensile strength of ramie fibre is 40 per cent, greater than flax, being

one of the strongest and most durable of fibres, and the least affected by moisture. Its filaments can be separated into floss as fine as silk. A string of ramie supported a weight of two hundred and fifty-two pounds, while a string of hemp of the same thickness broke with twenty-five pounds weight. These characteristics cause it to rank next in value to silk as a textile fabric.

The ramie plant is easily cultivated, yields enormously on rich, alluvial, sandy, loamy soil, and is successfully grown in the Southern States, the difficulty to contend with being the moisture of the climate, which is unfavorable to drying the stalks, which are filled with moist pith, and unless thoroughly dried soon after being cut they become mucilaginous and mildew and are worthless for fibre. Therefore, in a moist climate it is necessary to separate the fibre immediately after cutting, while the stalks are green, by what is known as the wet process, which is attended with greater expense.

The dry, hot summer climate of California more nearly conforms to the natural requirements of this semi-tropical plant, and the stalks dry without difficulty there. With suitable soil and good cultivation, after the plants are well rooted, several crops can be realized each year of about one thousand pounds of fibre at each cutting.

The soil best adapted to the growth of ramie is one that is friable and sub-irrigated naturally. No matter how dry the surface, if there is moisture six to ten feet below the surface, the long water roots, with their thick clusters of rootlets, will find an ample supply. It will grow on tule lands if not too wet.

The most satisfactory results are obtained by planting the roots four feet apart each way. Thoroughly cultivate the plants until they are sufficiently mature to layer the stalks. Then, after thoroughly pulverizing the soil, bend down the stalks in all directions from the plants and cover them with earth, except a few inches of their upper ends. The buried stems will send out shoots at each leaf, and sprouts will grow from them, and the ground will be thickly covered with plants the first year, which is very important. After the layering there is no more cultivation required, except one or two light weedings in each crop, the ground being so thickly cov-

ered and shaded that weeds and grass cannot grow, and no further cultivation is required in after years.

The crop can be cut with a mowing machine ; and after it has lain on the ground some time, until the stalks are cured and sufficiently dry, rake and bind into bundles, and haul to the machine to be decorticated into fibre. Ramie leaves are very valuable for paper making.

The great advantage in California over the rest of the United States is in the dryness and heat of the summer climate, causing the stalks to cure at once, so they can be decorticated and worked dry, producing a fibre of superior commercial value at greatly reduced cost in all the processes of its production.

A new machine was exhibited at the State Fair in the Machinery Department, in motion, which produced fibre in satisfactory quantities and quality, from California grown stalks, sent by Prof. E. W. Hilgard, from the experimental gardens, University of California. Samples of this product were sent to London, Boston, and other points, and pronounced by fibre brokers and manufacturers to be equal to the best fibre in the markets. A sufficiently high price has been offered for the product to make it a very profitable crop to grow. The California Ramie Company at San Francisco has been formed to promote this industry.

The successful production of ramie fibre in California is now beyond the experimental stage. It has been demonstrated that two or three crops can be raised annually, and, most important of all, they can be quickly dried on the ground and worked by the dry process at a minimum of cost compared with that of a moist climate.

Ramie is easily raised, no crop requiring so little outlay after the first year. It has no diseases or insects to contend with, and as two or three crops are obtained the second and following year, the returns from the investment are sure and speedy. The coarse parts are suitable for the manufacture of gunny cloths and paper stock, and for cordage, twine, threads and fishing nets it has no equal in strength or resistance to decay from moisture. It may become to California what cotton is to the Southern States.

Regarding ramie culture, the California Ramie Company gives the following information, viz :

Ramie will grow on any good soil that will produce other crops ; a deep, alluvial, sandy or loamy soil, well prepared, which holds its moisture during the growing season or which can be irrigated, is peculiarly adapted to a prolific growth. It may be grown in any portion of our State where frost does not penetrate the soil for a greater depth than six inches, and where, during harvest time (June to October), the atmosphere is free from dampness, in order to thoroughly insure the drying of the stalks.

The best time for planting is during the rainy season. After the ground has been thoroughly prepared by plowing for a uniform depth of about ten inches, and well pulverized, the roots should be planted in the first year, for the special purpose of propagation, three or four feet apart and slantingly, covering the top with two or three inches of loose earth. The first season the ramie requires careful attention and cultivation ; the ground should be kept clean and loose around the plants until they get a good start. When the first stalks have obtained a height of about three feet, they are ready for layering. The ground should be thoroughly moistened and the stalks bent gently down, fastened with small crotchets and covered with three or four inches of earth, leaving the top of the layered branch uncovered. Care should be taken to avoid detaching the stalks from the parent root. In the course of three or four weeks the layers will have made stalks, which can again be layered for the same purpose, and quite a number of plants can be dug out for transplanting, in order to increase the plantation. While layering is a very simple and easy method of propagation, cuttings can also be made early in the spring ; the stalks should be cut into lengths of from five to six inches and placed in the ground obliquely, leaving but a small portion remaining exposed. This can be continued as long as the ground is moist, and before hot and dry weather sets in, after which they would require watering and shading. The cuttings should be placed close together in rows to facilitate weeding. They will form roots in about fourteen days, and may be transplanted a few weeks later. Roots which have been growing one season can be subdivided into hundreds of parts from three to four inches long, each root planted separately. No plant responds to care more readily, no plant will grow as rapidly ; no root multiply quicker and produce more stalks ; in fact, no vegetable is handsomer, richer, and more silky than ramie. By the method of layering, the entire field will be covered with plants in the following year, and the stalks, growing closely together, will be straight and without branches, thus fit to be ready for the mower and for the decoricator after the stalks have been dried.

The leaves of the plant should be left on the ground as a very valuable fertilizer.

After two or three years the roots will form a solid bed from row to row, leaving no room for cultivation. It might then be necessary to use a sharp rolling cutter for trimming the beds or hedges to a width of not over two feet. The method for doing this should be to cut or trim from one side only and allow the roots to spread on the other side. This would annually remove the old hard wood, keep the roots renewed and vigorous, and perpetuate the crop.—*The Ramie Plant, by W. H. Murray.*

PLANTERS' LABOR AND SUPPLY COMPANY.

INCORPORATED MARCH 1882.

OFFICE—HONOLULU, HAWAIIAN ISLANDS.

ANNUAL MEETING IN OCTOBER OF EACH YEAR.

OFFICERS ELECTED OCTOBER, 1890.

A. YOUNG,	-	-	-	-	-	-	-	-	<i>President.</i>
J. B. ATHERTON,	-	-	-	-	-	-	-	-	<i>Vice-President.</i>
F. M. SWANZY,	-	-	-	-	-	-	-	-	<i>Treasurer.</i>
W. O. SMITH,	-	-	-	-	-	-	-	-	<i>Secretary.</i>
W. M. GIFFARD,	-	-	-	-	-	-	-	-	<i>Auditor.</i>

TRUSTEES ELECTED OCTOBER, 1889.

A. Young,	J. F. Hackfeld,	W. M. Giffard,
H. P. Baldwin,	W. O. Smith,	F. A. Schaefer,
F. M. Swanzy,	J. B. Atherton,	P. C. Jones.

COMMITTEES OF THE PLANTERS' LABOR AND SUPPLY CO.

APPOINTED OCTOBER, 1890.

LABOR—H. P. Baldwin, A. S. Wilcox, P. C. Jones.
 CULTIVATION—W. H. Rickard, R. A. Macfie, Jr., R. D. Wallbridge.
 MACHINERY—H. Morrison, E. M. Walsh, Jas. Renton.
 LEGISLATION—C. R. Bishop, T. R. Walker, W. O. Smith.
 RECIPROCITY—P. C. Jones, C. M. Cooke, L. A. Thurston.
 TRANSPORTATION—J. M. Horner, R. R. Hind, T. S. Kay.
 MANUFACTURE—Z. S. Spalding, James Renton, Jr., R. Halstead.
 LIVE STOCK—B. F. Dillingham, J. N. Wright, J. H. Paty.
 FORESTRY—W. W. Hall, W. M. Giffard, T. R. Walker.
 FERTILIZERS—W. W. Goodale, J. K. Smith, G. N. Wilcox.
 COFFEE AND TEA—C. Koelling, F. A. Schaefer, A. Dreier.
 TOBACCO—J. Marsden, J. F. Hackfeld, W. Y. Horner.
 RAMIE—W. R. Castle, J. B. Atherton, B. F. Dillingham.
 FRUIT CULTURE—E. C. Bond, J. K. Smith, S. B. Dole.