

THE HAWAIIAN  
PLANTERS' MONTHLY

PUBLISHED FOR THE  
HAWAIIAN SUGAR PLANTERS' ASSOCIATION

---

---

VOL. XV.] HONOLULU, OCTOBER, 1896. [No. 10.

---

---

The annual meeting of the Hawaiian Sugar Planters' Association will be held in their hall on Nuuanu street, Honolulu, commencing on Monday, Nov. 16, at 9 o'clock a. m. All members of the Association are particularly requested to be present. The session will probably last two days.

---

THE LATEST quotation of sugar in New York, October 1, was 3 and 1-16 for 96 deg. The tenacity with which the large stock of sugar remains on hand in the leading countries, surprises the trade. At the latest date, Sept. 20, it was 1,300,000 long tons—equal to three months supply, with the new crop of beet sugar to commence being marketed during October.

---

THE duty on foreign sugar imported into Germany, France and Austria is over four cents a pound; while in the United States it is less than one and a half cents a pound. Foreign sugars enter England free of duty.

---

So far as long street-car rides for a single fare of five cents is concerned, Honolulu is way behind American cities. The longest ride for five cents in San Francisco is ten miles,

in Boston, twelve, in New York twelve, in St. Louis and Chicago, each fifteen miles.

---

RIPÉ pineapples, that cannot be shipped, are now being utilized for medical purposes. The juice is expressed by machinery, and sold to chemists in Philadelphia, who manufacture it into "Pinapin," a new medicine that has proven very successful in the treatment of catarrhal disorders.

---

IN Utah, women are allowed to vote on the same conditions as men. Juries have a panel of eight men instead of twelve, but women are excluded. Six jurors are sufficient to convict. The State can never incur a debt of over \$200,000, except for insurrection. How these new features will work, remains to be seen.

---

AN ingenious whipstock, to prevent the purloining of whips from carriages, has been patented. The whip locks itself under two projections inside the socket and from which it is released by a secret slide on the whipstock. It is ingenious, inexpensive and self-operating, and is intended to successfully combat the evil propensities of the whip thief.

---

MANY good farmers make a mistake in plowing land or cultivating crops too soon after a soaking rain. As long as the dirt sticks together and won't pulverize finely when turned it is too wet, and where horses step the soil is packed and remains a hard clod the rest of the season. Nothing is ever lost by waiting till land is in proper condition to work.

---

THE currency value of \$100 in gold in the United States, as a yearly average, was as follows: In 1862, \$113.3; in 1863, \$145.2; in 1864, \$203.3; in 1865, \$157.3; in 1866, \$140.9; in 1867, \$138.2; in 1868, \$139.7; in 1869, \$133.0; in 1870, \$114.9; in 1871, 111.7; in 1872, \$112.4; in 1873, \$113.8; in 1874, \$111.2; in 1875, \$114.9; in 1876, \$111.5; in 1877, \$104.8; in 1878, \$100.8.

---

POSTAL cards may be used for any kind of communication, written or printed, or both, to be confined to the blank side.

On the address side nothing but the address, or such explanatory words as are properly a part of the address, is allowed to be written or printed. It is not permissible that even the sender's name be placed there, though this is allowed on all other classes of mail matter.

---

LORD ARMSTRONG, of Scotland, has at present more Japanese orders in hand than even his vast works can accommodate. A partner in one of these firms tells of a contract which was not known before—namely, that Armstrong has taken the job of building and entirely equipping a big naval yard and dock in Japan, where ships can be not only built, but armored, engined, and completely fitted by the Japanese themselves.

---

“To the sugar publications all over the world, more than any other medium, we are indebted for the progress in the sugar industry. Through them we have been able to acquire a familiarity with each other, until the east and the west, the north and the south have been brought together into one great body of brotherhood. Full praise, then, to the sugar journals for their valuable and noble work in promoting and aggrandizing the sugar industry.”—*Exchange*.

---

A PERSON not familiar with the facts, can have any idea of the poverty in large cities. The annual report of the Benevolent Society of Sydney, N. S. W., has lately been published, showing that 1880 families, representing nearly 7000 persons have been receiving assistance during the past year. The report says, that the classes who are worst off are clerks and shopmen, who were discharged in the previous period of depression, and who held aloof from seeking assistance until their own resources were quite exhausted.

---

THE low grades of centrifugal molasses are now quoted down to three cents in New Orleans, which simply pays the cost of the barrel and its transportation to the city, without any consideration whatever for the molasses. The *Louisiana Planter* says: “If it is found that hogs will fatten readily on molasses, as quickly, in fact, as on corn, the idea of shipping it to the city and selling it at three cents per gallon, or

even six cents per gallon, would seem rather discreditable to the intelligence of those who are doing it."

THE Onomea Sugar Company of Hawaii, are about to replace their old mill with a new nine-roller mill of the Cora pattern, such as is in use on the Ewa Plantation. It will be a size smaller, the rollers being 66 inches in length, but in all other respects the same. Other important changes will be made, and when completed, the new mill will be among the most efficient on Hawaii, and those interested expect to see it secure most of the "last ten per cent. of sugar in the cane," which all are now working hard to get.

THE great electric power plant at Niagara has thus far supplied current only to factories close at hand. Active steps are now being taken, however, to furnish other cities. The contract has been let for the construction of a line to Buffalo, fifteen miles away, over which eventually about 20,000 horse-power will be transmitted. This would require all of the output of four 5000 horse-power dynamos. At least 1000 of this will be taken by the Buffalo Street Railway Company. That particular customer pays \$40 annually per horse-power, but is to have it for \$36 if it takes more than the amount mentioned.

THE large sugar estate, known as the Chino Beet Sugar Ranch in Southern California, owned by Richard Gird, was sold by him to an English syndicate, which failed to meet the engagements entered into, and the estate was again taken possession of by him. The syndicate has now made arrangements to fulfill their contract, which was to pay Mr. Gird \$1,600,000 for his property. It is a very valuable property, and is capable of being largely increased. Messrs. Eaton & Eldridge of San Francisco, the well-known capitalists, will be the agents, and in all probability the estate will now be carried on successfully.

GENERAL WEYLER'S edict, forbidding the exportation of bananas from Cuba, will not have the disagreeable effect in America that the brutal Spaniard desired, but, on the contrary, it will mean the total destruction of the banana trade from Cuba to America. The Boston fruit dealers were

forced by Weyler's edict, to arrange with the United States of Colombia for their bananas. The first cargo from Colombia arrived lately. There were 14,000 bunches and though they were nearly three days longer in transit than the Cuban cargoes the bananas were in excellent condition and a new trade is thus established.—*Boston Journal*.

---

PUBLICATIONS RECEIVED.—From the Agricultural Experiment Station of Nebraska—Bulletin No. 44, Reporting Experiments in the Culture of the Sugar Beet in that State.

—From the same. Bulletin 45, showing the average rainfall in Nebraska for a series of years.

—From the United States Department of Agriculture—a leaflet on the Larger Cornstock Borer.

—Circular for the Fifth National Irrigation Congress to convene in Phoenix, Arizona, December 15.

—General Catalogue of Avery & Sons, Louisville, Ky.,—Plows and Sugar Planters Implements and Machinery.

—Fourth Annual Report of the Hawaiian Historical Society of Honolulu, containing various documents of interest.

---

BOOKER T. WASHINGTON is principal of the Tuskegee Seminary in Georgia, one of the most prominent of the institutions devoted to the colored race. Recently, one of his pupils, who had become an expert in the printing trade, was offered a position in a large printing establishment conducted by whites, and another similar position was offered to him in an office owned and conducted by colored people. The expert printer chose the latter, giving as his reason that he could do more to elevate his countrymen and the quality of their work in it than in the other. Probably he received the inspiration from Prof. Washington, who is one of the most noted pupils of the late Gen. S. C. Armstrong, and attracted much public attention, for having made the most eloquent of several addresses at the opening of the Atlanta Exposition in 1895.

---

THE COFFEE CROP.—According to a recent official statement there were in 1894 in the Mexican State of Oaxaca alone 62,692,500 coffee trees. In 1893 the exports of coffee from Mexico amounted to 14,514,919 kilogrammes. New

plantations are being constantly created. Messrs. W. H. Crossman & Co., of New York, estimate that the Brazil coffee crop of 1896-7 will be about 10,000,000 bags, of which about 8,500,000 bags will be marketed. Brazil has lately furnished 55 per cent. of the coffee production of the world. All other countries for some years past have furnished an average of 4,889,041 bags per annum. If they produce this average the total supply for 1896-7 will be 13,389,000 bags. The consumption is calculated at 11,250,000, bags, from which it appears that there will be a surplus, including the quantity carried over, of about 2,500,000 bags. It is calculated from this that lower prices must rule during the coming year.—*Rio News.*

---

MR. C. M. Heintz, proprietor of the Rural Californian of Los Angeles, made a flying visit to Honolulu in the early part of this month, and was a very welcome visitor. It is much to be regretted that his stay here was so short—but five days—that he had opportunity only to glance over Honolulu, and the surrounding districts. Mr. H. thinks that spraying with Paris-green insecticide would check much of the ruin caused in and around the city, particularly to rose bushes and other flowers, which have become very scarce. Mr. H. is secretary of the National Irrigation Congress, which holds its fifth annual session at Phoenix, Arizona, in December. Phoenix is a city of some 12,000 inhabitants, and is the capital of Arizona, which offers a vast field for irrigation enterprises. Had Mr. H. remained here longer, and visited Kauai, Maui and Hawaii, he might have seen what has been accomplished here by skillful engineering, and taken some pointers of practical value to the new states and territories, where irrigation is sure to open a grand field for enterprise in the near future, whether the water supplies are derived from the mountain streams or artesian wells. Perhaps a commission from the Phoenix Congress could find no more interesting field for investigation than Hawaii affords. Should one be sent, it will be most cordially received. The Rural Californian, which Mr. H. represents, is one of the leading monthlies of that state, devoted to tropical fruit culture, and from it, one can form a better idea of what is being accomplished there, than from any periodical we might name.

---

*BOUNTIES AND SUBSIDIES.*

---

In the Manchester Sugar Cane for September, (page 452) is reprinted from the *St. James' Gazette*, an interesting article on European bounties and their effect on the trade of the British Empire. It refers chiefly to the large bounties on sugar now given by Germany, Austria and France, and also to the steam lines subsidized by the above and other countries, which are injuring the British sugar refining and marine commerce. Few people are aware how severely this European competition is affecting the commerce of England, as is shown in the articles referred to. But the writers appear to forget that the subsidizing of steam lines was first inaugurated by the British government, and has successfully built up her commerce to surpass that of any other nation, and made her practically mistress of the seas. European countries are therefore merely adopting her policy. Bounties and subsidies are only another form of protection to home industry, by building up the commerce or the industries of the country adopting them. Whether given in the form of subsidies for carrying mails, or bounties on the production of sugar, or duties on imported foreign products—they seek practically the same result, protection to and fostering of home industries, by the exclusion of rival foreign products. It is very likely that the United States will be compelled to adopt the same system as regards her foreign mail service, her rising sugar industry, and other less prominent industries,—to check the growing discontent of the laboring classes, who are taught to believe that scarcity of silver is the great cause of all their social troubles, whereas it is really the scarcity of labor.

— :o: —

*ENEMIES OF THE COFFEE TREE.*

---

On page 460 will be found an interesting article giving the experience of a coffee planter in India, and some of the diseases which he had to contend with, as well as his treatment of them. To most of those who are now embarking in coffee culture, it is a new and untried business, and all the inform-

ation that can be gathered from the experience of others must prove of value. The coffee tree is a delicate plant, and falls an easy prey to some of the many enemies that attack and thrive on the sap of the flowers, fruit, leaves or roots of the vegetable world. The antidotes used in exterminating one class may not do for others, so that, when one class of parasites is exterminated, another may soon take their place, and do as much harm as the first.

Attention has been called in the daily press, to the black blight, as having attacked the coffee trees on Hawaii. If we are not mistaken this is the same disease which attacks the orange trees, causing the young fruit to shrivel and drop off, and in many cases causing their death. It may also be seen on the Pride of India trees, though it rarely kills them. In India, when it attacks the coffee trees, carbolic fumes have been successfully used to check it. But this is a tedious process, which seldom succeeds in entirely destroying the blight. In a recent English agricultural periodical, we notice the following remedy as having been successfully used on orange trees in South Africa :

“Mr. South, an orange-grower of Bedford, South Africa, recently found his orange trees were slowly dying, one, indeed, being so far gone that he cut it down, and to kill any little vitality there might be, he bored a hole in the trunk, filled it with carbolic acid, and then plugged it. Soon after, there was a vigorous and healthy growth, and Mr. South determined to try the same treatment on all his trees. Consequently a hole six inches deep was bored in each tree, near the roots, and the carbolic acid poured in. The result was marvelous. Fine healthy foliage has taken the place of the diminutive leaves on the trees before treatment, and there is a good crop of fruit. As a year has passed since the carbolic was used, there seems to be no room for doubt that it has a lasting and beneficial effect.”

—:—

### *BET SUGAR IN AMERICA.*

There is every indication that a “beet-sugar boom” is springing up in the United States, which needs only protection by the national government to place the industry on a firm basis, that will secure for it permanent prosperity. The success which has attended the three or four initial beet



sugar enterprises in California, Utah and Nebraska, has satisfied farmers and capitalists that this business will secure even better returns to those who engage in it than are had in Europe. Recent advices show that beet factories have been or are about to be established in California, Oregon, Washington, Utah, Nebraska, New Mexico, New York, and other States,—not as experiments, but as permanent investments, which are likely to be more profitable than wheat or any other cereal products. In New York, a bounty of one cent a pound is offered for all sugar made from beets grown in the State during three years, and purchased from farmers who are paid five dollars a ton for the same.

Among the more recent developments is the fact that New Mexico is admirably adapted to the growth and saccharine qualities of the beet. The popular idea of New Mexico is that it is a hot, dry, sandy and barren desert, unsuited for cultivation of any kind. This may still be true of portions of it, but where the land can be irrigated, it has been demonstrated that fruit trees and rich beets can be grown with less expense than in other sections of the United States. In the Pecos Valley, where an abundance of water has been secured for irrigation, eighteen hundred acres of beets have been planted, and a sugar factory erected, and the first crop was to be harvested during the present month of October. It is claimed that the percentage of sugar in the beets will surpass that of Chino or Watsonville, where it has reached 20 and over. What extent of land can be irrigated has not been stated, but it is quite large; and as the necessary conditions in all other respects are very favorable, it is not unlikely that within a very few years, New Mexico will become the center of large beet sugar enterprises.

The first beet sugar factory erected there is located in the town of Eddy, in the Pecos Valley, and is capable of disposing of about 300 tons of beets per day.

---

The statement that Col. Spreckles intends to erect a new beet factory in Salinas Valley, Cal., which will be capable of consuming 3,000 tons of beets daily, may be correct so far as the capacity of the factory is concerned; but to make it do that work is quite an other thing. Watsonville and the

Chino factories, which have each the capacity of crushing, from 800 to 1000 tons daily, and possibly more on a rush, seldom consume more than 700 to 800 tons, when every branch of the field and factory works smoothly. The gathering, cleaning and transportation of even a 1000 tons of beets a day requires quite an army of skilled men and cars, with no let up, day or night. However, the Colonel's intention is to do what has never been done in California or Europe—to erect a beet factory that will attract the attention of the whole world, and give the beet business a boom in America, which it would receive in no other way.

—————:o:—————

### *LABOR AND COLONIZATION.*

In the event of the annexation of Hawaii to the United States, which is among the possibilities of the not-distant future,—some system of colonization will need to be devised, to provide labor for the increasing wants of our leading industries—sugar and coffee—which now rely chiefly on Japanese and Chinese.

During the year 1895, over 50,000 Italians entered the United States as immigrants. Of these, it is said, a portion came on certain terms before agreed on, to serve as laborers in factories and other service. They land as free immigrants, but on going west in colonies, under overseers, they enter into specific engagements for three or more years service, several families being often located in one place. They are said to be well housed and well provided for, and become contented and attached to the service. This course is pursued to evade the stringent laws which forbid contract laborers being brought to the United States.

As stated before, we rely now for labor, largely on Japanese. During the past two years, the prejudice against these people has been subsiding in Europe and America, as they have shown themselves to be superior in all respects to the Chinese or any other Asiatics. Owing to this change of public sentiment, there will probably be a relaxation of the popular prejudice in the United States against them as a people, and laws prohibiting their immigration will be removed, perhaps not at once, but gradually. In that event,

it may be possible to secure colonies of these people, who after their arrival here, will enter into engagement for three, four or five years, returning at the end of their term of service to their own country, but not permitted to go to the United States, so long as any prohibitory law remains in force there.

If no arrangement of this nature can be made, renewed efforts to bring colonies from different countries of Europe may succeed, as was done here some twenty-five years ago. To obtain all such immigrants of one nationality would be a mistake, and might lead to trouble, whereas, if they were of different nationalities, there would be less chance of this. Some of the European colonies referred to have proved to be valuable citizens, while others were the reverse.

Hawaii is not the only country seeking colonists for settlers or laborers. Mexico, and other Spanish American countries are inviting them. Even British Columbia feels the need of securing immigrants as settlers as well as laborers. The following, taken from a Vancouver paper, expresses the general sentiment in British Columbia :

"Some simple scheme of colonization is one of the wants of the day, and though such schemes exist amongst the German and French people, there are none that have been started by Britishers. The Mennonites, the French-Canadians, the Moravians and a Danish colony or two are examples that can be pointed out, but beyond a few small groups of people scattered here and there with no aims in common, there are no British settlements, and there are no organized plans for settling or even assisting British people to found settlements where the advantages of community can be carried out and agriculture developed.

"Some of the blame may be thrown, perhaps, on our increasing love of city life and the hastening to get rich, which has made us forget the solid and beneficial advantages of agricultural life. Whatever the difficulties, a great effort should be made by the province of British Columbia to overcome them and secure population, for at present we in this province of great fertility are actually importing most of our food. The returns of the United States show that 72, per cent. of the whole income of that country is derived from agricultural produce, while British Columbia, with equal facilities for raising the same kinds of grain, meat, and most of the useful fruit, is importing annually three million dol-

lars' worth of agricultural produce to feed a population altogether about equal to that of a second or third sized English town."

—:O:—

*GRINDING CANE BEFORE IT IS RIPE.*

EDITOR HAWAIIAN PLANTERS' MONTHLY, DEAR SIR:—Some planters, for various reasons, are always in great haste to start up grinding early in the season, a long time, as a general thing, before the cane is matured, and in consequence, not only lose a large amount of sugar themselves, but cause the manufacturers to lose as well. It is generally considered that in places where there is a large crop to harvest, that there must be some loss at both ends of the season; but my experience proves, that there is usually greater loss at the beginning, and as a general thing, very little or none at all at the end of the crop. In fact it is, almost always, at the end of the crop that the best results are achieved; and this is about the only time, except, perhaps, the middle of the crop, that there is any pleasure in working or handling the juice. Planters' often make another mistake, in supposing that because the cane is green, it will yield a much larger quantity of juice, and therefore offsets, in a measure, the loss in density and purity; but so far from this being the case, I find that a mill will generally do about as much when the juice is standing at 20 Brix as at 17 or 18 Brix. I however will admit, that a slight quantity more juice may be got when the cane is green, but not enough to counteract the loss in manufacture that results from grinding green cane.

In my opinion, thousands of tons of sugar are lost annually, in this way. All I would ask, is that planters will give the cane a chance to perfect the work which it has begun; for in this particular business, sugar cane and some few other plants are wiser than we are, or for that matter, all the world combined; for although we know the constituents, carbon, oxygen, and hydrogen, of which sugar is composed, yet there is not a man in the world who can make sugar out of these substances. It is only the plants themselves that possess the inestimable power and knowledge; therefore give them a chance. Besides, it must be painful to them, to be cut down just as they are about to perfect their good work, and it seems a great pity too.

Now I dare say that there is two sides to this question, if only I had the wit to see the other, and I shall feel obliged to anyone who can refute me, and show that I am in error; because, as it is, I feel that it is not only a great wrong to the plant itself, but to the great Beneficent Provider as well, to cut it down before it is matured.

MANUFACTURER.

REMARKS:—There is much force in the statement of our correspondent, as the experience of planters will attest, though more formerly than now-a-days. We shall never forget the story told by a plantation manager, some twenty years ago, who received instructions from the owner of the estate to commence grinding on the first day of November, giving as his reason, that the price of sugar was high, and he wished to market his crop as soon as possible. The manager mildly remonstrated that it would not do to cut cane in tasseling time, as the juice then stood low, and it was more difficult then to make it grain well. “No matter for that—obey orders, if you break the owners,” or something to that effect, was the only answer he received. So the cutters were set to work, and the fires started, and grinding commenced early in November, while the fields were still in full bloom. Of course the juice stood low at the start—6 deg. to 8 deg.—just as the manager well knew it would, but there was no option for him but to obey orders. He immediately wrote to the proprietor, stating the case, and giving figures showing that the cane was unfit to grind, and that the loss would be large, if the work continued. Orders were finally received for the manager to use his own judgment in the matter, and a halt was called, but only after a considerable portion of one of the best fields had been cut off.

Cane should be cut for the mill only when fully ripe. It is not ripe until after the tasseling period is over, as during the rapid growth of the plant at this period, an excess of water or moisture is drawn up the stalk, and the strength of the juice in it stands low. The process of sugar making begins in the field, after the tassel stalk dies. It is then that the sun is the planter's warm friend, and rapidly commences the process of ripening the juice, which continues for three or

four months, during which time the plant requires little or no rain or irrigation, as it has finished its growth and the sap or juice is daily becoming richer. Were it possible to grind all the cane during March, April and May, the yield of our cane fields would undoubtedly be largely increased. Hence the advantage of having powerful mills to do the most work in the shortest time, when the juice stands at its very best figure. This is the goal for which all sugar planters should aim, and those who most nearly reach it will be the most successful.—EDITOR PLANTERS' MONTHLY.

—:O:—

### *PRUNING FRUIT TREES.*

[I send you a few notes on pruning, which I shall be very thankful if you will publish, my object being to try and remove some prejudices against the operation and acquaint fruit growers with some of the mistakes made by them in their system of fruit growing in the Island. A little personal experience following upon the lessons of illustrious authors on agricultural science, such as Boussingault, Liebig, Ville, Wagner and others has aided me in this attempt, so that if your readers find my notes of any value at all, let them render their thanks to those high authorities and be thankful only to them.]

The pruning of fruit trees is the most important part of fruit culture, when we want to obtain a proper and well-matured crop. I have seen very little done in this line in Ceylon by a few amateur growers, and nothing at all by the natives who, on the contrary, dare not cut a single sucker off a tree fearing they might injure it. Plenty of wood, little fruit, and that sour, are the results of this treatment. If oranges are cultivated properly, there is nothing in this island to prevent the trees giving us fruit as good as is obtained in other countries. I am not blaming the poor villager for leaving his fruit trees to grow wild, and so lose the chance that nature, assisted by a little care and labor, offers him. If he does not know any better, is he to be left in his ignorance for ever? And is it not the duty of somebody to begin to show him his errors, and so encourage him towards earning an honest and remunerative livelihood,

and thus render his life more useful and happier than it is today ?

I will not say that by pruning old trees we will obtain at once good fruit (as no grafting has ever been attempted but all trees grown from seedlings, generation after generation, a good fruit cannot easily be obtained) but by taking one of these trees thoroughly in hand and letting it undergo rational pruning, the improvement in crop and quality must follow. By suppressing a useless branch the sap which went to support it will go to the benefit of those remaining, and their buds being well nourished will soon bring forth the healthy shoot which in time will carry blossom and fruit.

I consider the very last days of drought the best time for pruning here; at this period there being practically a cessation of growth, the plant will be saved from the shock of heavy pruning.

The tree must be trained from the very first to a single stem, and preference always given to the healthiest and straightest. This attention paid to a young tree will make it grow fast and vigorously, and there will be no harm in allowing it its own way till it reaches its third year of existence, when we will have to prune it so as to give it a uniform appearance. The vigour of a tree depends mostly on the equal distribution of sap to all its branches. If a branch does not receive a full and regular flow of sap, it becomes weak and bears but poor fruit which will never attain proper maturity. It is hence necessary if we want to secure for our trees both symmetrical form and vigorous health to prune so as to maintain an equally distributed flow of sap through all primary branches. The way to bring about this equalized flow consists in cutting little or nothing off the weak branch but shortening the strong branch to the height of the weak, taking care to cut short at laterals.

The durability and vigour of a tree depends a good deal on the relation of the branch system to the root system—the growth above ground to the growth below ground. This is why in transplanting any sort of tree we must cut its branches proportionally to the roots, the same as when a tree is effected by root disease or when very old.

The sap is always inclined to run from the roots to the

branches as vertically as possible, so that it is found to be more copious in vertical than in lateral branches, and this is the reason why long vertical branches should be shortened to the height of the rest.

It would break the heart of native to see about ten feet of a fine long branch ruthlessly cut of while endeavouring to emulate the neighbouring coconut tree (not seldom too neighbourly.) In views of the native's prejudice to pruning I might give this advice: when a branch of an orange tree is too vigorous in growth, and therefore little productive of fruit, in order to stop its growth, it can be arched or bent. Again, a bent and feeble branch can be rendered vigorous if straightened. The sap in a short-cut branch, or in one that has been bent, will bring forth healthier buds than it would if the branch when cut is still fairly long or is left straight. This fact is easy of comprehension—the sap having to nourish a few buds only will be more abundant and the few buds will bring forth shoots much stronger than those produced by fifty or sixty.

We should never prune for fruit only, but try and prepare our wood for the next year also. Practice only will teach the pruner to distinguish between a branch carrying shoots with buds for fruit, and another for wood, the principal rule to follow being that the same shoot which has given us fruit this year will not do so next year unless a secondary one is formed during the fruiting season.

If a tree has been exhausted by a heavy crop it is advisable to prune it very short for two years, not for fruit but for wood. By this means it will obtain a sufficient quantity of new wood to revive the circulation of sap and so re-establish the needed equilibrium for the production of fruit. The sap being always inclined to ascend to the extremities of the branches will develop the upper buds which greater vigour than those in the middle or at the bottom. This should always be taken note of when we are pruning young trees and want to obtain elongation of the other branches. In cutting a long branch short, the cut should always be made about half an inch above the healthiest bud or shoot.—*Corr. Trop. Ag.*



NOTES ON SUGAR IN HAWAII, 1896.

[BY J. HASTINGS REID, PH. D.]

(Continued from page 422)

CULTIVATION.

The consideration of cultivation matters is perhaps best preceded by a few remarks on rainfall and temperature. As will be seen from the following table the rainfall is greatest on the island of Hawaii, although the northeast coast of Kauai has a rainfall somewhat greater than the drier districts of Hawaii. Western Oahu and the district of Northern Maui have but very little rainfall. All the plantations on Kauai, Oahu, and Maui, visited by me, practiced irrigation, while on Hawaii, with the exception of a small experimental area, the plantations depend on natural rainfall:—

RAINFALL, 1895, (inches).

Plantation.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Kilauea.....	8.93	18.81	15.41	5.94	4.41	3.90	2.69	3.08	3.87	7.08	5.96	4.04
Lihue.....	5.50	14.84	4.61	1.81	1.25	0.60	0.41	0.94	1.48	2.78	4.98	5.35
Makaweli.....	3.89	9.55	3.13	1.98	0.02	1.15	0.54	0.60	1.53	3.13	2.40	3.35
Ewa.....	1.91	11.04	2.91	2.47	0.00	0.00	0.00	0.00	0.17	0.00	8.15	1.34
Waianae.....	0.00	15.10	0.00	3.01	0.00	0.00	0.00	0.03	0.00	0.61	5.09	0.98
Kahului.....	1.42	7.45	0.00	0.00	0.00	0.00	0.33	0.00	0.20	0.00	0.67	1.20
Naalehu.....	2.49	8.40	10.82	1.92	1.42	0.15	2.71	1.13	1.12	0.85	14.16	4.44
Pahala.....	0.00	14.71	7.61	1.84	1.28	0.65	0.46	1.60	2.81	0.82	13.19	3.61
Hilo.....	2.00	8.74	15.90	19.81	10.67	9.74	8.34	5.74	5.68	10.00	15.20	6.90
Pepekeo.....	5.16	6.04	13.60	14.30	7.33	5.97	7.25	5.50	7.20	8.57	13.89	9.28
Laupahoehoe.....	8.80	6.49	21.73	19.32	8.90	7.40	6.31	4.00	3.83	6.83	4.96	5.11
Pauuhau.....	6.85	6.23	7.82	5.31	2.13	1.67	2.35	3.71	0.32	1.02	0.84	2.59
Kukuihaele.....	7.60	7.27	7.35	4.19	3.88	2.36	4.01	1.00	0.58	1.02	1.10	3.52
Kohala.....	5.21	4.58	5.93	6.89	4.83	4.60	5.23	1.97	1.62	1.71	2.05	2.39

All irrigated plants.

The temperature shown for Honolulu might, within limits, apply to the western coasts of Oahu and Kauai and perhaps to the northern districts of Maui but on Hawaii the temperatures are generally lower, while on Northeastern Hawaii the coolest weather is experienced.

MINIMUM AND MAXIMUM TEMPERATURE AND RAINFALL, HONOLULU, 1893.

Month.	Aver. Min.	Aver. Max.	Mean Range.	Rainfall (in.)
January.....	65.0 deg. F.	76.3 deg. F.	11.3 deg. F.	2.88
February.....	65.9 "	77.3 "	11.4 "	14.91
March.....	67.5 "	78.3 "	10.8 "	1.31
April.....	69.6 "	79.8 "	10.2 "	2.32
May.....	70.5 "	81.0 "	10.5 "	2.22
June.....	70.9 "	81.7 "	10.8 "	0.64
July.....	71.5 "	83.1 "	11.6 "	0.75
August.....	71.7 "	83.7 "	12.0 "	1.60
September.....	71.3 "	83.4 "	12.1 "	1.73
October.....	71.8 "	81.8 "	10.0 "	1.18
November.....	67.2 "	79.2 "	12.0 "	9.93
December.....	65.1 "	77.5 "	12.4 "	1.95

All the cultivatable sugar land in the Hawaiian Islands, with minor exceptions, may be considered to be situated in a gentle slope between sea level and 2000 feet of altitude. In some districts large blocks of land, unbroken by any obstacle, have been put under cultivation, while in other places, notably the Hilo, Hamakua, and Kohala districts the land is much broken up by gulches and uncultivable knolls. The natural drainage is perfect, but, in some of the steeper localities, this is not without drawbacks on account of the removal of much fine earth and manure in the drainage waters during heavy rains.

The character and depth of soil varies very much. Generally speaking the soils of Kauai, Oahu, and Maui are chocolate red and of considerable depth rather poor in organic matter but of exceedingly fine mechanical condition. On Hawaii the soils are usually of darker color and much richer in organic matter, but not of such fine tilth. The Kau district has deep surface soil. South of Hilo, of recent formation, is the shallow soil of Waiakea averaging about six inches in depth—overlying porous lava. North of Hilo is also a shallow surface soil with an unfertile clay subsoil. This class of soil continues into the Hamakua district when deeper and darker soils of excellent quality are met with. In the Kohala district the soils are usually in good mechanical condition, and fairly deep. The following table will briefly indicate the leading features of each island or district where the principal plantations are situated:— [See opposite page.]

Owing to the different kinds of soil and the differences in climatic and other conditions the methods of cultivation vary considerably. In the first preparations of the land the main point arrived at is deep and thorough plowing and the pulverization of the soil to a great depth which is usually only limited by the practical working of the plow or the thickness of the surface soil in which plant growth can take place. On the irrigation plantations, which have generally great depth of soil and where steam plows are commonly used, the preparation is of a very thorough character. The following is an example of especial work as practiced at

----- :-

Island.	Rainfall.	Temperature.	Land.	Soil.	Remarks.
Kauai, N. E.....	Moderate.....	Cool .....	Rolling.....	Deep chocolate...	Steam cultivation, irrigation, railway transport.
“ E. & S. E.....	Light.....	Fairly warm...	Rolling.....	Deep chocolate...	Steam cultivation, irrigation, railway transport.
“ S. W.....	Light .....	Warm.....	Rolling.....	Deep chocolate...	Steam cultivation, irrigation, railway transport.
Oahu.....	Very light.....	Very warm ...	Even.....	Deep chocolate...	Steam cultivation, irrigation, railway transport.
“ .....	Very light.....	Very warm ...	Level .....	Deep brown.....	Steam cultivation, irrigation, railway transport.
Maui, N.....	Very light.....	Warm.....	Rolling.....	Deep brown.....	Principally steam cultivation, flume, and railway.
Hawaii (Kau).....	Light .....	Cool.....	High rolling	Deep dark brown	Horse cultivation, rainfall and flume, and railway.
“ N. E. (Hilo).....	Heavy (well dist.)	Fairly warm...	Gentle slope	Shallow light....	Horse cultivation, rainfall, railway and flume.
“ N. E. (Hamakua)...	Medium.....	Fairly warm...	Gentle slope	Deep dark.....	Steam and horse cultivation, rainfall, cart, rail and gravity bed.
“ N. (Kohala).....	Medium.....	Fairly warm...	Gentle slope	Deep light.....	Horse cultivation, rainfall, cart, and flume

1st operation	steam	cultivating	to 12 in. deep.
2nd	"	"	plowing to 14 in. deep.
3rd	"	"	harrowing.
4th	"	"	cross-plowing to 16 in. deep.
5th	"	"	cultivating to 20 in. deep.
6th	"	"	harrowing.

All these operations may not be practiced on every occasion, and perhaps plowing or cultivating and harrowing may be combined. However, such work pulverizes the soil thoroughly, and an idea may be gained of the trouble taken to prepare the soil for that most important condition of fertility, viz., open texture. On land so prepared it has in some cases been found profitable to ratoon on specially good fields to the tenth crop. On —, where the crops are usually plant and first ratoon, an average yield of  $5\frac{1}{2}$  tons of marketable sugar (about 95 or 96 n.t.) per acre is obtained, and that with the most moderate use of manures and exceedingly poor crushing. The general practice is to (first) steam plow about eight inches, (second) cross-plow to sixteen inches; if necessary steam cultivating and harrowing follow before the land is furrowed out.

In localities such as — and —, where coral earth and coral sand are easily obtainable and cheaply applied, very heavy dressings of these are given to new land or land which is considered at all stiff or sour, and this practice has been followed by the best results. Even in other localities, where lime is expensive, planters use it as liberally as possible whenever necessary. In several instances managers drew my attention to excellent crops of cane where previously there had been poor ones, and this improvement was put down to the lime dressing, which exerts a beneficial influence over many seasons.

Mr. —, of —, said that on one block of stiff land, where previously he used to get but little over  $1\frac{1}{2}$  tons sugar per acre, he had given a dressing of coral sand (perhaps 30 to 40 tons per acre), and now the yield has been raised to over 6 tons sugar per acre. "Formerly," he said, "the land was sticky when wet and cracked on drying, thus causing waste of irrigation water, besides breaking the plant rootlets and stunting the growth of cane. Now, the mechanical condi.

tion is entirely altered, the capacity for retaining moisture is much increased, and the land is more easily worked." All this is in accordance with the well-known effect of lime—it acts as a manure partly directly but chiefly indirectly, operating on both mineral and organic constituents of the soil. It binds together sandy soils and improves the mechanical condition of clay soils, besides sweetening soils of a sour character. Nowhere in Hawaii did I see land needing so much the liberal use of lime, both mild and caustic, as that of the Fiji flats. It is futile to expect good results from the use of expensive artificial manures on soils not in good condition, and there is but very little land in Fiji that has come under my observation to which this term can be applied. Soil must be open and loose so that the cane roots can spread with freedom in every direction, and draw nourishment from the plant food originally present as well as from that which may have been artificially added.

Returning again to Hawaiian practice. After the preliminary preparation during which manures (other than lime, stable manure, or compost) are rarely added, the land is furrowed out about four feet to six feet apart by double mould board plows drawn by mules or bullocks, and the irrigation ditches made. Some planters give an application of manure in the furrows before planting, for instance, of very fine bone meal, fish guano, or high grade manure, but the general custom is to manure, after the plant is well up, with high grade manure in one or two applications according to discretion. The quantity of manure given depends on the previous behavior of any given field—poor patches might be heavily manured, while good portions would probably receive no manure at all.

In those districts where the soil is shallow, as Hilo with only six inches to eight inches of surface soil, horse plowing is usually practiced to the depth, and a cross-plowing is not frequently given. Harrowing generally follows, and shallow furrows from five feet to six feet apart are made. When this operation is completed a dressing of manure is often given in the furrow, after which a small plow is drawn twice along the bottom, and this is followed by a harrow or Planet, jr., cultivator. Such careful preparations make a fine well pulverized seed bed.

Whenever the soil is of any considerable depth, then deep cultivation is practiced, furrows of the greatest practicable depth are made, and the plants are laid as low down as possible in the furrow.

Quite a diversity of opinion exists regarding the best part, as well as the best age, of cane to use for plants, and from the excellent results obtained from all the various customs adopted one is apt to come to the conclusion that, as long as a plant is from healthy stock possessing well developed eyes and of not too immature growth, serious mistakes cannot be made. When planting can be carried on at the same time as crushing thin tops of fully matured plant or preferably ratoon cane (before arrowing) are generally taken. In other cases a decided preference is shown for "lalas" (the shoots which spring from the top of mature cane after arrowing) they having well developed eyes and besides being very woody. On some of the finest irrigation plantations "volunteer ratoons" only are used for seed. This is the short-jointed neglected growth which springs up on a temporarily abandoned field; these ratoons are very woody, but when young (say six months) have full firm eyes. There is a decided objection to suckers and soft immature tops. The special growth of cane for plant is not generally favored, and is seldom practiced. Whatever is chosen for plants depends largely on local conditions, and the experience of one manager may be, and perhaps with good reason, different from that of another if even on an adjoining plantation. The same remark also applies to methods of cultivation and varieties of cane, and I have been impressed with the opinion that any attempt to apply stereotyped detail instructions in regard to agricultural procedure in Hawaii would be a fatal mistake. Each district should find out for itself the most profitable practice, and so long as this is left principally to the practical and intelligent agriculturist, grave errors are not likely to occur.

Plants are generally cut into four, five or six eye lengths, according to discretion, on the field and bagged for transport. Whenever possible seed is flumed before planting, or when this is not convenient the bags are drenched with water one or two days before the plants are required. This practice in

Hawaii is very highly spoken of, as it facilitates rapid and vigorous shooting of the bud. On the irrigation plantations, on account of being able to water at will, this custom is not followed. Change in seed is frequently made from high to low lands and occasionally from one district to another.

The principal variety grown is Lahaina cane (Honolulu), and this is liked best of all. It is always planted in the most favorable localities, but is recognized as being a very delicate plant, and not well able to withstand adverse conditions. Quite a large area of Rose Bamboo is under cultivation, but is mainly confined to the high lands and droughty districts. It has been found to be a hardy cane, ratooning well and better able to withstand cold and drought than Honolulu. In some districts, such as South Hilo, this variety does indifferently, growing thin and spindly though long jointed, but further north it improves. In the Hamakua district, which is subject to droughts, Rose Bamboo is principally planted and gives very favorable results.

Yellow Caledonian (Malabar) is having a trial in the Kau district of Hawaii—so far only on a small scale—but it is already looked upon by Mr. —, of —, as the most promising variety of any he has met with for Kau conditions. The appearance of this cane was certainly magnificent.

Yellow Bamboo (Whitney cane) is also promising well in the same district; little, however, is known regarding its suitability as a sugar producer, though it evidently yields good tonnage of cane. There are several native varieties, but nowhere are they grown to any extent though previous to 1870 they were the principal canes grown, opinions differ as to their value for sugar production.

The time and style of planting depends very much on local conditions. While in the irrigation districts planting takes place after the crushing season is over, say from June to September—in some parts of the island of Hawaii planting may be done all the year round or entirely during the crushing season. As a rule the higher elevations are planted early in the year, as, with the cooler climate, the development of the cane is not so rapid as to endanger arrowing in November (the arrowing period). The lower lands are generally planted after June, when arrowing in the first follow-

ing November will be escaped. Any cane planted much before June or ratoons from cane cut before that period may be cut back in July so as to allow of sixteen to eighteen months of full growth. The cut back cane is either burned off, buried, or, if ratoons used for seed. The kind of weather, quality of seed, and class of land will largely influence the procedure of planting. Sometimes the planting is end to end, at other times a space of six inches to nine inches may be left between plants, while frequently double planting is practiced. The plants are very lightly covered with fine earth, unless during dry weather, in the rainfall plantations when the depth of covering may be between two inches and three inches.

On the irrigation plantations the general routine of cultivation after planting does not vary much. Weeding is done entirely by hand and hoe, and this work is performed by the laborers who attend to the irrigation. When artificial manures are used these are applied in the cane furrows at each side of the plants, after they have achieved some growth. Fields and headlands are kept scrupulously clean, and trashing is generally practiced two or three times. From careful experiments made by Mr. —, of —, it would seem that in dry districts, at least, there is no improvement in the purity of cane by stripping (trashing), and non-stripping is being freely advocated. On the other hand, unstripped cane is much more expensive to cut, and there is greater liability to loss of cane on the field. Mr. — gives the following figures as averages of his tests:—

Plants, stripped... ..	84.5 quot.	Ratoons, stripped. ....	87.1 quot.
“ unstripped .... ..	85.7 quot.	“ unstripped.....	87.1 quot.

In November the cane attains after about sixteen to eighteen months' growth—the most vigorous growth taking place between the months of April and September (summer). Soon after November crushing commences, and this continues until the following June or July. After cutting, trash is burned off, plant furrows relieved, and the cultivation which follows is the same as for plant crop, viz., hoeing, watering when necessary, manuring and cutting back in July if the growth is not likely to be sufficient before the following November. Ratoons which have been cut back



are called "long ratoons," otherwise "short ratoons." The long ratoon crop yields about as well as a plant crop. Local circumstances sometimes advise the cropping of plants only : more generally plants and first ratoons are taken off, while again in specially good open soil several ratoons may be profitably cultivated.

In districts where the soil is very shallow and rainfall plentiful, shallow plowing and furrowing are practiced, and horse work between the cane rows is adopted. Manuring after planting is customary, being distributed at each side of the cane row and hoed under. By the time the cane closes in, the soil between the rows has, by plowing and hoeing, been well hilled to the plants. This hilling appears commendable in shallow ground, for it furnishes an artificial depth of soil, and at the same time would protect the plant rootlets from excessive moisture were drainage defective. Stripping two or three times is greatly advocated in this district. Fairly heavy crops of great sweetness and high purity are obtained, chiefly Honolulu variety. After cutting, trash is burned off and canes relieved. The stubble digger goes twice over the stools, manure probably being applied on top of the stools between the two operations. Stubble digging is highly commended by the planters. The cane is then plowed from, the harrowing between the rows soon follows. Plowing too is the quickly succeeding operation, and subsequent cultivation is much the same as with plant cane. With Rose Bamboo, which shoots rather freely, it is a common practice to shave the rows with a revolving coulter, when plowing from in order to thin out the sticks.

In districts where the soil is deep and easily worked and there is a liability to droughts, the practice is to plow and furrow as deep as possible. A dressing of manure is most likely dusted into the furrow before planting, and the plants are laid as low down as they can be placed. Subsequent cultivation is carried on by hand work only, and by the time the cane closes in the shoots are still in the trough of a narrow furrow. Rose Bamboo is largely planted, and stripping is strongly advocated. After cutting, trash is burned off, cane rows relieved, and no other cultivation is given except hand hoeing, manuring, and stripping. It is claimed

that, when the land there is thoroughly prepared at the start, horse-work between the rows does more harm than good in that it packs the lower layers of surface soil. Severing old stool roots when ratooning has not been found at all necessary nor helpful in facilitating the growth of the young ratoon. Stubble diggers also are not required, as the soil remains sufficiently loose around the stool. This style of cultivation seems to have been initiated by Mr. —, of —, and it is certain that no better looking cane is grown on the island of Hawaii than that of — plantation, where, in average years, about five tons sugar per acre is obtained from plant cane and about four tons per acre from long ratoons with by no means first-class crushing.

Of late years the use of artificial manures has been rapidly on the increase. Though the value of green manuring has been fully recognized by the more intelligent planters, there are only a few instances where this valuable practice is put into effect. Portuguese lupins are used: cow-peas have been frequently tried, but with satisfactory results. At — I was shown experimental patches, on which lupins had been plowed in, side by side with others, which had not been so treated, and the difference in the following cane crops was most marked. Mr. —, of —, estimates that by green manuring he will be able to increase his yield of sugar by over one-half ton. —, is in the Hamakua district, which is sometimes subject to drought; it certainly is commendable to increase the organic matter in the soil there, as it will increase the soil's retentive capacity for moisture and so minimize the ill effects of a long spell of dry weather.

Mr. — has a very good method of keeping his stable manure, which is perhaps worthy of imitation. He beds his stock with trash, and every day the stable cleanings are carried out to the manure heap, which is protected from rain by a rough iron shed roof. Every evening a number of sheep are driven into the heap, remaining there until morning, they pack the manure well down, and at the same time add to it by their droppings. A small quantity of kainit or superphosphate is sprinkled over the heap daily to retain any ammonia which might be generated. The manure heap is surrounded by a retaining wall of lathed wire fencing,

which also serves to prevent the sheep from straying away during the night. Last year Mr. — obtained 1500 tons of rich compost valued by Dr. Maxwell at \$4 per ton. This compost is generally applied to land at the rate of seven to eight tons per acre, probably that rather deficient in organic matter—and results are both gratifying and lasting.

Filter press mud and megass ashes are often thrown away or else not utilized to the best advantage, but in a few instances some care is taken in returning these to the soil. Mr. —, of —, deposits all his mud press cake and ashes under cover in separate heaps, and the former soon dries hard. In the dry state it is mixed with about equal weights of megass ash and passed through a Carter-Harrison disintegrator, being delivered from that machine in a fine power, when it is filled into old manure sacks. The cost of this operation is under 50c. (2s.) per ton, and handling in the field is much facilitated and cheapened, besides a good even distribution is ensured. Of the commercial manures the largest proportion used is the so-called "high grade fertilizers," which are mixtures in all sorts of ratios, of superphosphate, bone meal, guano, sulphate of ammonia, kainit, Chili saltpetre, and dried blood. Fine bone meal and fish guano are often used, and give good results, particularly when applied at or before planting. The apparently best informed planters seem to prefer a slowly soluble manure for general purposes and for application during preparatory cultivation. Dressing of soluble manures (high grade), after the cane is well up, are recommended if appearances indicate any want of nourishment. Great care and judgment is exercised to prevent too rank growth which means loss by rotten cane, low purity, and increase of borers. The maximum purity is aimed at. "High grade fertilizers" are sold at prices varying from \$30 to \$50 per short ton according to composition. Fine bone meal imported is from San Francisco at about \$28 to \$30 per short ton, and from India at slightly lower rates. Fish guano comes chiefly from San Francisco and Japan, and costs about \$33 per short ton. In the application of manure planters vary a good deal. From 500 pounds to 700 pounds per acre in one, two, or perhaps three dressings, some before and some after planting, may be considered

about average figures. In one instance I found a manager applying 1500 pounds of high grade manure per acre, but this practice seems to be overstepping the line of economy. The use of artificial manures has, I am told, been followed by immense improvement in the yield of sugar per acre, and, where judiciously applied, without noticeably affecting the purity of the juice. That the manures should be effective one can readily understand when looking at the condition of the soil. A good mechanical condition is of the utmost importance, and this is natural to most of the Hawaiian soils; where this is not the case the free application of lime, coral sand, or coral earth, seems always to have produced the desired feature. In European countries farmers have for centuries used marl and lime to improve the textures of their soils. In the West Indies the practice of liming cane land is common. In Egypt the rich and fertile soil of the Nile basin is heavily charged with carbonate of lime, and in Hawaii liberal dressings are in instances applied.

*(To be concluded in November.)*

—:o:—

### COFFEE PLANTING IN INDIA.—EXPERIENCES OF A PLANTER IN THE WYNAAD DISTRICT.

From an interesting account published in "Planting Opinion," we extract the following paragraphs, showing the trials and trouble which planters experience and have to contend with in that country, a knowledge of which may be of service to planters in these islands:—[EDITOR PLANTER.]

MANURES AND WHITE ANTS.—After the yield of the maiden crops of Coffee manuring was undertaken to the greatest available extent, but only in a few instances did I ever see this important branch of cultivation carried out systematically, or with any marked degree of success. A great variety of artificial manures were imported from England and other countries, and applied at considerable cost with, in the majority of cases, no profitable results whatever. Those manufactured in the country, and consisting of a compound of fish, refuse oil seeds, crushed bones, and other ingredients alike proving of limited utility, resulting from various causes,

perhaps not the least formidable of which being the voracious propensities of the white ant, that with unerring instinct quickly discovered the presence in the soil of any of the above-named foreign matters, and crowded in myriads to the feast, and as these substances were of necessity applied during the dry weather the insects had every facility afforded them of consuming the greater portion of the intended Coffee-food before the rains set in or root action began. Cattle manure, produced at considerable cost, shared the same fate, the white ant being particularly partial to it as an article of food. Many planters, being fully alive to this serious hindrance to the object in view, ceased to expend money on manures altogether, and in consequence were not unfrequently blamed for bad and unthrifty cultivation by persons ignorant of the above facts.

**SURFACE AND SUB-SOILING.**—At higher elevations than 3,000 feet, where the white ant was less numerous and not so destructive, manuring was generally undertaken with better result, but surface-soiling or top-dressing with a thick coating of fresh soil from the neighbouring jungle, was perhaps the best and most lasting stimulant I ever saw applied to the Coffee tree in Southern India on lands with an elevation of from 2,000 to 3,000 feet, surface soil, of course, having always the best effect; even subsoil of any kind, when applied in thick coatings, proving of great advantage. This plan of assisting the Coffee tree was primarily discovered by accident by some planter having occasion to cut new roads through an old and partially abandoned estate. This work was performed during the dry weather, and the roads cut winding along the steep hillside, the excavated soil being simply thrown down hill amongst the trees to get rid of it, the trees to all appearance being worn out and of little value. This soil reached perhaps to a distance of three or four lines of trees, and when the rains came they at once began to feel the beneficial effects of the dressing of soil, and produced an abundance of healthy and vigorous shoots, and during the succeeding dry season belts of deep green and healthy trees were seen on the lower sides of all the new roads, whilst all the other portions of the estate looked yellow and unhealthy. The hint was soon taken, and surface-soiling became part of

the yearly routine of work on most estates with the happiest results, in some instances planters going so far as to drive roads in all directions through aged estates that had almost given up bearing as the cheapest way of obtaining the soil, and always with good results. All this pointed directly to the evil effects of denudation on steep lands during the heavy rains of the south-west monsoon, and this act of top-dressing was simply one of striving to supply the place of the soil that had been washed from the whole surface of the land by the yearly recurrence of the monsoon gales.

**LEAF ROT AND HANDLING.**—On the Ghaut estates the trees suffered greatly during the monsoon from leaf rot, caused by excessive and long-continued moisture, and lack of sunlight. This had to be guarded against by disbudding at the right time, for any accident delaying or preventing this was certain to result in the destruction of nearly all the leaves and a large proportion of green Coffee berries also. This long-continued cloudy and wet weather had not unfrequently a similar effect on weeds and plants indigenous to the country.

**DISEASE-PROOF COFFEE.**—I have frequently noticed what I used to suppose was a distinct species of coffee, which seemed to escape the leaf-disease to a considerable extent. Every estate had a small proportion of this sort. It grew more stiff and erect than the ordinary type, had much narrower leaves, and flowered twice a year, the first time just after the south-west monsoon, and the second when rain fell or together with the other kind. The berry was more oblong, and the plant seemed to withstand the long drought much better than the ordinary kind. The nature of the climate and the planter's duties preclude the possibility of his undertaking experiments in the way of hybridising or selection of a nature likely to prove of any real utility in the way of producing new varieties likely to prove more hardy and better adapted to the climate. It was therefore all the more to be regretted that the Government did not come to his assistance, and instead of devoting all their attention in horticultural matters to the gardens situated in such delightful climates as Ootacamund and Bangalore, they did not divide it between them and such deeply interesting and splendid districts as Wynaad and Coorg.

[Then follow some interesting notes on leaf-disease, which we reproduce in full. The remarks on the leaf-disease worm we do not remember having read before.]

A CURIOUS WORM.—Large sums of money were again spent in artificial and other manures in order to sustain the vigour of the plant and, as it was supposed, to render it less liable to the attacks of the fungus; but up to the time I left the country in 1877 all the expenditure of energy and money had resulted only in a partial and limited degree of success.

The fungus could be seen more or less on the leaves of the Coffee bushes throughout the whole year, but the time of its greatest appearance was between the ending of the south-west rains—about the middle of September—and the end of crop-gathering—the end of December. At the latter date it was no unusual sight to see plantations denuded of leaves and with quantities of fruit of a greenish yellow colour, which refused to ripen, and which had to be gathered in that state, dried in the cherry, and afterwards pounded out in mortars yielding Coffee of a very inferior quality. The fungus, or rust as it was sometimes called, first appeared on the leaves in the form of spots of a bright orange-red colour, which gradually merged into each other till the whole of the back of the leaf became covered with a thick coating of the fungus, resembling a red powder, staining the fingers freely when touched. On the first appearance of the fungus in the form of spots alluded to above, each spot contained a small worm about  $\frac{3}{16}$ th of an inch in length, which could be easily seen by the naked eye; but whether this little worm or maggot was the outcome of the growth of the fungus on which it fed, or whether it was the attack of the insect on the leaf which caused the growth of the fungus, no one seemed to be able to say, but the presence of the insect was an undoubted as well as a curious and interesting fact. As the fungoid growth spread on the under side of the leaf the upper surface gradually became yellow, owing no doubt to the tissues of the leaf being destroyed and ending in the leaf falling. The disease was not confined to Coffee under any particular condition as regards culture, but appeared everywhere, on highly cultivated estates, on estates receiving cultivation only in name, on the trees remaining on abandoned plantations, and on trees

that had sprung up from stray seeds in the jungle, so that it would appear that the disease was propagated by the spores floating in the atmosphere, detecting a congenial lodging place on the leaves of the Coffee plant, wherever or in whatever condition found.

**LIBERIAN COFFEE AND THE DISEASE.**—An idea sprung up in the minds of a number of planters—after it was found that the highest cultivation it was possible to adopt had but a limited effect in checking the disease—that such a deterioration had taken place in the constitution of the ordinary Coffee grown in Southern India from some cause unknown, that it was absolutely necessary to procure “fresh blood” in the form of a distinct species of Coffee, possessing, if possible, a more robust constitution. Just at that time the Liberian Coffee was much spoken of, and an English firm of nurserymen was raising plants from seed procured direct from the West Coast of Africa for export to India or elsewhere to anyone wishing to try the experiment. I was induced amongst others to order a Wardian case of plants to be sent out, which was done very promptly by the firm alluded to. The case contained seventy plants in thumb pots, and so admirably were they packed that every plant reached me in perfect health after a voyage and journey covering some forty days. The case reached me in December. I opened it at once and shifted the plants, which were then only about 3 inches high, into larger pots; they at once started into growth, and by planting-out time had grown into strong, healthy plants of an average height of 1 foot. These I planted out very carefully on a piece of good land on a new plantation I was then engaged in forming. The plants did not make much progress in the open ground during the continuance of the heavy monsoon rains; but as soon as these moderated, the plants began to grow rapidly, and by the time the dry weather had fairly set in had produced shoots of a very satisfactory growth, and leaves of an enormous size in comparison with the ordinary Coffee of the district. As time went on I found traces of the leaf-disease on the young Coffee trees of the ordinary type, of which I had planted some 150,000 at the same time as the Liberian species; but no appearance of disease of any kind on the plants from England.



Matters grew gradually worse with the common species of Coffee on the estate till at last they were utterly divested of every leaf and left to weather the ensuing hot season under bare poles as best as they could. The Liberian plants resisted the disease for such a length of time that I thought they were going to be proof against it; but in this I was mistaken, they caught the contagion at last and perished more rapidly than the plants of the old species of the same age. This was a very disappointing and disheartening experiment to me. It cost the respectable sum of Rs. 500 or £50, which was, of course, thrown to the winds. I may also add that this particular plantation, although formed under the favourable circumstances with regard to richness of soil, abundance of water, favourable aspect, &c., had to be abandoned long before the period at which it ought, under ordinary circumstances, to have yielded its first crop, and this solely in consequence of the leaf-disease. It would appear from the above experiment that the disease was propagated by atmospheric influences alone, and was not the result of any inherent weakness in the ordinary Coffee of the district produced by raising plants from the same seed for a number of years, as was supposed at one time by many planters.

Estates at high elevations escaped the scourge of leaf-disease for a considerable time after it had wrought such havoc on estates at an average elevation of 3,000 feet, but eventually it reached them, but hardly with such disastrous results, the colder nature of climate at these higher elevations helping the plants through their seasons of privation. When an estate suffered to such an extent (I mean on the lower elevations) as to leave it without a single healthy leaf by the end of December—which was often the case—it was usual to prune the trees back severely, the primary shoots coming under this operation, which, under more favourable circumstances, were never touched. Manure was then given to the roots to the greatest extent possible, and with the first rain the trees at once started into growth, and were quickly re clothed in verdure, but of course no hope could be entertained of a crop for the next season, the tree only producing fruit on the one year old wood. All would go well up to the bursting of the monsoon, and throughout all the rainy months.

When the rains ceased, the trees presented generally a very beautiful appearance, covered with long freshly-made shoots and glossy leaves, but only, alas ! to succumb to the attacks of the fatal fungus as soon as the dry weather again set in, and thus the battle went on till the year I left India.

[Luckily men there were who stuck to the old district, men of unflinching courage and rare endurance, and by their unflinching endeavours a new and yet brighter future awaits grand "Old Wynaad."—*Editor P. O.*]

—:o:—

### PRACTICAL NOTES FOR FARMERS.

[CONDENSED FROM CORRESPONDENCE WRITTEN FOR THE MACKAY STANDARD, BY J. D. HENNESSEY, LATE EDITOR OF THE AUSTRALIAN FIELD.]

(Continued from page 417.)

I have been asked for some hints upon co-operation, and the sale, etc., of products, by a correspondent resident in a large dairy district. It so happens that an interesting report has just been issued by the French Minister of Commerce and Industry, which was made under a commission from the Government. It contains much very useful information, and many practical hints which will be of service to Australian as well as French farmers. One remark took my fancy straight away. Says Comte de Roguigny: "When an industry is prosperous, individualism is natural enough to men whose living can be assured by their own efforts; but when trials arise, the utility of association is immediately felt, for it alone can give the individuals the power which is indispensable for a successful struggle against financial difficulties."

This is perfectly true, and illustrations of it are to be seen in all the agricultural countries of Europe. Co-operation in agriculture has long ago ceased to be an experiment. Belgium, long famous for co-operative bakeries and credit-banks, has, since 1891, made vast strides in agricultural co-operation; at the close of last year she had sixty-five co-operative dairies, besides a number of other agricultural syndicates. Denmark has been made from an agricultural standpoint by co-operation. Every village now has its co-operative dairy, and

almost all agricultural operations are being successfully worked there upon similar lines, among them being numbered no fewer than sixteen co-operative societies for the slaughter and curing of pigs, which handle about half a million pigs every year, or one-half of the pigs reared in the country.

The method of management in these pig establishments may be mentioned, for the pork and bacon business is one which there is money in, and which many farmers would do well to look after. It seems that the members of the society engage to furnish for a certain number of years—seven or ten—either all the rear, or a certain number of pigs annually. The price of the pigs is regulated by the market price, which is fixed by a committee and published weekly. The whole of the produce is sold on commission to the English market, which takes about £2,200,000 worth of bacon annually. These pigs are brought to early maturity in six months by the use of separated milk from the dairies, mixed with cheap corn and linseed. The local breed of pigs has been improved by crossing with imported boars from England, and the Danes are confident that on these lines they can defy competition.

The growth of co-operation in Germany, Switzerland and Northern Italy is very noticeable. Societies of this description in these countries are numbered by thousands. The Agricultural Supply Association, of which there are over a thousand in Germany, are one of the latest developments. They buy and sell seeds, manures, etc., and purchase and let out steam machinery. Orchard work and fruit-preserving are there carried on upon the same co-operative principle. Dairying on this plan is becoming almost universal on the continent, and the method is generally very well understood, but there they have gone further than we have in Australia, for the formation of butter factories in France led the small proprietors to combine together to obtain the profit from the manufacture of butter rather than sell their milk to the factory, and thus they have been able to do away with the middleman. In almost all cases the piggery forms an important adjunct to the butter factory, and largely increases the profits. It should be noted that in our competition with

these countries we must remember the low rates of wages and salaries which obtain. In France the manager rarely receives more than £40 per annum, the butter-makers and engineer from £24 and upwards. The milk is brought from the members' homes by a contractor, who, where calves are reared, has to return the skim milk the same day. Some associations have a system of insurance for accidental death, which provides 75 or 80 per cent. of the value of the animal lost. The result of the establishment of these co-operative associations, we are told, has been that the old dairy associations not founded upon co-operative principles have been unable to compete with their newer rivals, and have generally been bought up by the co-operative associations. The owners of cows have, in every way, profited, but economy of management has been insisted upon.

In Brittany a proprietor of about 400 acres has recently started two steam dairies, and has made a novel arrangement with his tenants. The tenant has no rent to pay, and he is only bound to provide as much milk as possible from his farm equal in value to his former rent. The kilo of milk is taken at  $5\frac{1}{2}$  centimes in winter, and  $4\frac{1}{2}$  in summer; but, in fact, the farmer, under this plan, receives as much for the sale of his milk as he had to pay in rent. Supposing his rent was £40, he has nothing to pay and receives at least as much. He also takes one-third of the value of all animals born on the farm when sold, and the laborers one-sixth. The proprietor (Comte de Lamboisere) furnished the original herd of cows, all of which are Jerseys, and takes the whole control of the rearing up of the stock. Should the sale of butter exceed (1) the original rent, (2) the price paid for the milk, (3) the interest and sinking fund of the capital sunk by the landlord in stocking the farm, the tenant receives a fourth of the surplus, and the laborers also one-fourth. This arrangement is said to have worked well for both parties for about four years, until 1891, but recently has proved unfavorable to the proprietor. As Lord Egerton remarked in one of the magazines, the plan seems too complicated to work smoothly for long, but still it is well for us to know how other people are trying, in competing countries, to advance dairying, etc.

It may be said emphatically that the manufacture of both

cheese and butter by the factory system has been proved in Europe to give better results to the keeper of cows. In France the people seem to have embraced the co-operative system in a remarkable manner. The supply of milk in Paris is largely provided by a dairy union of farmers, who sell milk from seven large depots. And other co-operative societies have recently been formed for the same purpose. The syndicates of gardeners and others which exist there for the sale of early vegetables and fruit are also noteworthy, and certainly might be imitated with advantage in other countries. The Nantes co-operative syndicate, for instance, sold in one year 1,400,000 pears and 91,000 dozens of bundles of radishes in England, and was able to pay its members 10 per cent. ready cash over market prices, and, in addition, show 28 per cent. profit. But these things are being made now a perfect study in Europe, and farmers, dairymen and fruit-growers there are learning the force of the old proverb that "union is strength."

#### CONCERNING IMPROVED STOCK.

The stud sheep sales this year in Sydney indicate an upward movement in wool-growing. The extraordinary price of 1600 guineas given for the grand champion ram "President," owned by Mr. James Gibson, of Belle Vue, Tasmania, is noteworthy as indicating the competition which exists among breeders to secure the best blood. I had a good look at the show, and attended the sales, but was not present when "President" was sold. "It was a most exciting affair," said a friend to me. After a thousand guineas was reached, great cheering accompanied every bid until it was knocked down to a Tasmanian purchaser for the great sum stated (£1680) for one ram! I fancy that I hear some readers say: "The man must have been a born idiot to give such a figure for one ram; I would want, at least, 2000 rams for that money."

Now I am glad to have this bit of a text to preach a short sermon from. I lately advised my readers to put a hundred pounds into a pure-bred bull, and to give long prices for cows if, by that means, they could secure extra good milking qualities, and then to build up a herd of dairy cattle which, in time, would be better than a gold mine. One man wrote to a paper to know who I was to give such advice as that. I

dare say, among his private friends, he called the writer a fool, with an adjective in front of it. I wonder what this good man has to say to £1680 being given for a single ram? I am not going to say that the above was not a fancy price; but it is a sign of the agricultural times, and I would like my good friends, the farmers generally, to take heed of it. The two Tasmanians who bought the ram were not the only men prepared to give a long price for him. Mr. Austin, a Victorian breeder, bid only ten guineas less. The fact is, the knowing ones have found out that tip-top quality pays; that half-a-dozen clean, healthy, pure-bred Vermont merinos are worth more than a paddock-full of the sheep found on so many stations. It is the same with cows, with horses, with pigs, there's room at the top, and money to be made there. The watchword of modern agriculture is quality. "If we cannot have much, what we have shall be good," so people are cutting down their areas, weeding rubbish out of their herds and flocks, and aiming at much in little.

Here are two men who have given a fortune for a ram; its a risk, no doubt, he may die; but if he lives for a few years, as he probably will, do you think they will lose money over him? Not they. The very price given for this sire will help to make his progeny more valuable. I visited the station of a squatter a couple of years back who had just given a very long figure for a ram. I knew a good many thought him a bit of a crank and said he would never see his money back again; but I notice that men who pay these big prices are men who have made money beforehand, and have a very good idea of what they are about. It was so in this case. I found the small station in apple-pie order. It was a place where disease, dirt and failure were not tolerated; everything was on the upgrade; the place was choke full of wrinkles—new ideas and useful economies; and, although he had given a price as long as your arm for a merino ram, the purchaser was a far-sighted, long-headed Scotchman. Let me say, just here, that the days of the cheap and nasty are over, and men who are always on the look-out for bargains might as well give up farming. Its come to this now-a-days that shoddy, in the shape of inferior wool, or second-rate dairy produce, or low-

grade stuff of any kind, does not pay. Its the gilt-edged article which makes money, and, with the tremendous output of inferior produce all over the world, its the top quality which everyone wants, and which is everywhere going to pay.

The gentleman I referred to was averaging fully one pound more wool to each sheep than his neighbors, so he could afford to give a good price for a ram. An extra pound weight of wool to every sheep in Australia would mean an addition of three millions sterling to our revenue. Three millions sterling would buy a good many pure-bred stud rams! It surprises me, by the way, that more of our farmers on the coast do not go in for a few well-bred sheep to run in the home paddocks. Long-wools would do well for this purpose; the small farmers fancy them greatly in New Zealand. Some people have an idea that sheep do no good on coastal lands; but small flocks, properly attended to, will do well anywhere, and it is wonderful how they increase, and the wool-clip, though small, is a very handy item to bring in hard cash when other crops are not plentiful. Sheep will feed and do well where cows and horses could not get a living, and there are many things which a small mob of sheep will pick up in the way of green stuff which larger cattle would never touch. Don't trust your sheep, however, if you are on a small farm, to your man, or put them in paddocks at a distance from the house, for eagles, hawks, crows and other birds will play havoc with your lambs; and dogs, both wild and domesticated, may hunt your sheep.

#### HOW TO MAKE GOOD BUTTER.

"As iron sharpeneth iron, so doth a man the countenance of his friend." Judicious discussion is, without doubt, the best way to get at truth. I thought that in a former letter I had dealt very fully with the question of butter-making, but a correspondent (who is a small farmer, and evidently a man of intelligence, for he writes a very good letter), thinks that I have not fully explained the matter so as as to make it perfectly applicable to small farmers. Probably, moreover, my correspondent's difficulty may be shared by other small farmers; so as these papers aim, above all else, at being practical, I

will; even at the risk of repeating something which has been said before, try and comply with my correspondent's request.

My correspondent is a small farmer who churns about 12 lbs. of butter in a "Cherry" churn; he sets his milk in tin dishes, and has only the simplest appliances. He says: "Now, what I should like to learn would be how to make good, sweet butter that will retain its sweetness of flavor for say a week, or even three days. "This," says our friend, "is a very difficult question to solve;" and the inference further on in the letter is that he has found dairy butter to keep better than creamery or factory; but none of it to keep as well as might be expected. Now, I have made butter myself many a time with a "Cherry" churn, and this is a method I would recommend to a small farmer without ice, separator or anything of the sort; and I am fully aware of the fact that these notes are read by many of this class.

I will take it for granted that the cows have been milked in a clean yard, where no foul odors have had access to the milk, and where fowls are not allowed to roost at the head of the bails, or pigs to make their dormitories; also, that the dishes for setting the milk have been thoroughly scalded, and that it has been set (after being aerated) when warm in a light, clean, airy place, or dairy—cool in summer and warm in winter. My correspondent asks here whether I would advise the scalding of the cream? No! some people do it, but I have never been partial to this method for butter-making. When skimming your cream, don't put any more thick milk in it than you can help, and keep your cream stirred to prevent fermentation. If you have aerated the milk well by pouring it from one vessel to another in a pure atmosphere, or by running it through a strainer on high legs so as to get a good fall through a current of air into a bucket, the cream will be less likely to ferment. This aerating of the milk, by the way, should be done as soon as possible after taking it from the cow. Aeration removes most of the peculiar odor which the cow imparts to the milk. There is also eliminated from the milk, by evaporation, certain objectionable volatile elements often found in it. Further, by bringing the microbes of fermentation into contact with free oxygen they become less active, and the cream will commence to rise to the surface under the most favorable conditions.



The cream dish might have a small plugged hole in it to let off the sour whey before the cream is stired ; this will all help to keep the cream in better condition. Don't mix any unripe cream with the ripe cream ; it ripens in the summer time in twenty-four hours, and sometimes less. In winter time you must warm your dairy by artificial means if you are to produce the best butter. Monday morning's milk in summer time should be skimmed on Monday night and the cream strained through a sieve, so that if there are any curd clots in the cream they will be kept from going into the churn. If these get into the churning, your butter will have white specks which will spoil its appearance, turn your butter sour and ruin your trade. Now put your dish of cream outside for the night in a current of air, it will then be cool, and ready for churning in the morning before sunrise.

Churn as cold as you can without having the cream foam and swell. If it foams and swells much, it is too cold ; don't churn too fast at the commencement. If it is too warm, the butter will be soft when it comes. The temperature for churning depends partly upon the feed of your cows and the quality of your cream ; from 55 to 65 is the proper temperature, but you must find out the exact degree for yourself. Note the temperature for a few churnings and you will soon know that which is best for your cream. If you have only a very little cream in summer time, and find for some cause or other that the butter won't come, put the cream in a linen cloth and hang it up in the shade like a water bag, the water will evaporate from the cream on the outside of the cloth and keep it cool, and, with a few turns of the handle, your butter will come in the evening.

I am supposing that you have a medium-sized "Cherry" churn. Scald it over night—no matter how clean it is ; then fill it with clean, cold water. In the morning before sunrise, pour out the water, damping the lid of the churn, and then pour in your cold cream out of the dish. I am writing, of course, for warm, summer weather, as that is the time when small dairymen have the greatest difficulty to make sweet and good-keeping butter. You must churn every morning in the summer time or your cream will be spoiled by age. But now you can hear by the changed sound of the churning that

the butter has come. When it is the size of grains of wheat stop churning at once, every particle of butter you will get from the cream has come. Pour in some cold water, turn the handle a few times, lift the butter on top with a skimmer, take out the plug to draw off the buttermilk, letting it run through a sieve so that any small particles of butter may be caught. Now put the butter back into the churn and wash it; draw this water off and pour in the brine, or, if you salt it with dry salt, wash it a second time and then lift it out into your butter tub or board. By this means (washing the butter in a granular form) you will get rid of almost all your buttermilk before you work it at all, and remember that it is the casein, lactic acid and milk sugar left in the butter which causes it to quickly decompose, turn sour and rancid. Work it gently and spread out in the tub, letting the water drain from it in a sloping position. Work it a second time in the evening, just to press out the brine and to prevent pin-rolling; don't rub and grind it so as to spoil the grain; do it up with a light and loving touch, and you will have gilt-edged butter equal to or better than anything turned out of a creamery, and moreover which, if carefully packed, will keep sweet and fresh for a month or more.

Of course, if wanted to be kept for a long time, there must be more salt put with the butter, and, to have it keep at all, it must be in a dairy or "pantry" which is perfectly sweet and clean, and free from other odors. The above directions, by the way, are not extracts from anything I have read, but are the result of personal experience, carried out on a small farm in a warm part of the country; and, if they are carefully followed, and the cows are properly fed and their udders washed before milking, and the milkers not allowed to smoke while milking or about the dairy, and are made to keep their hands clean, I'll stake my hat upon it that you will be able to make sweet-flavored and good-keeping butter.

*(To be continued.)*

—————:o:—————

There are in London 151 Church streets. Those called Union are 129; John, 119; New, 116; George, 109; Queen, 99; King, 95; Charles, 91; William, 88; James, 87; Princess, 78; Elizabeth, 57.

---

*THE CANE-BORER.*

---

In this number we give extracts concerning the cane-borer, which deal with the pest from two different points of view. From the Barbadoes, where the borer is a standing menace to the crops, not only in consequence of its attacks upon the cane itself, but also through its rendering the cane liable to the ravages of disease, through the affected parts, we learn that some success has attended efforts made to trap the moths. For a comparatively small expenditure of money one gentleman has caught 6000 of the insects, and it is reasonable to suppose that with an increase in the number of traps still further inroads may be made upon the pest. It is noteworthy that the traps used are very much in the form of those recommended for snaring the chafers of the grub pest, namely, a vessel with a mixture of water and molasses, and a light placed over it. This year in Queensland a number of grub beetles have been caught in this way, and growers cannot do better than to utilize the traps on a larger scale, and more regularly, thus catching the beetles at one time of the year, and the borer moth at other times. The information with regard to the borer, which comes from Cairns, is, we regret to say, far from being of the same satisfactory nature. Though the assertion that the borer has caused the very greatest anxiety in Mackay is rather wide of the mark, still there is no doubt that the possibility of the pest spreading has been a matter of serious consideration with all thoughtful growers. It should, however, be noted that the New Guinea borer is the *Sphenophorus Obscurus* while that in Mackay is the *Nonagria Exitiosa*. It cannot consequently be said that the pest is already in the colony. It is not, therefore, re-assuring to learn that a majority of the canes, the importation of which from New Guinea we reported in our last number, are infested with the borer, and that the Department of Agriculture, instead of ordering their instant burning, had given instructions for them to be planted in the nursery at Kamerunga. Those who have any acquaintance with the caterpillar of the moth-borer know it to be most active, and cane containing it should not be left for a moment undestroyed, or the grub will make its escape.

But the worst feature of the affair is the fact that these borer-infested canes are supposed to be carefully picked plants, collected under the supervision of the Government Entomologist and absolutely free from any pest or disease. If the borer can thus easily escape observation, the possibility of introducing healthy new varieties without risk of importing pests or diseases with them appears to be very remote. The question has yet to be answered: Was ordinary care used? That Mr. Tryon knows the necessity of taking every precaution is proved by the following excerpts from his paper on "New Varieties and New Diseases" (*S. J.*, Vol. IV., page 185):—

"It may be added that the danger of introducing the same formidable sugar cane pest from New Guinea is even greater than it is from the Sandwich Islands. In the Annual Report of the Department of Agriculture for 1893-4, Mr. Ebenezer Cowley, overseer of the State Nursery, Kamerunga, in referring to New Guinea sugar cane, states as follows: 'It might be well to note here that many varieties of sugar cane seen by me in New Guinea were so devoured by insect pests that clean specimens were not easily obtainable;' and in the collections that he secured it is not surprising therefore that the *Sphenophorus*, which as before remarked inhabits New Guinea, occurred; this insect manifesting itself—first in the small portion of the shipment that was retained at Kamerunga, in which its occurrence was proved by myself; and afterwards in the cane that was forwarded to New South Wales, in which its presence was detected by the able entomologist of that colony, Mr. S. Orloff.

"How, then, it may be asked, is the risk to be avoided in procuring new varieties of cane? In the first place we must ascertain the diseases and the insect pests that affect sugar cane in other countries from which importations are contemplated but not already in this; and in the second that the standing crop from which seed cane is to be procured harbors none of them; and we must ascertain this as the result of actual inspection on the part of a responsible expert."

But it is not satisfactory to learn from the under-secretary that it was never expected that the cane brought from New Guinea would be absolutely free from pests or diseases, and

that Mr. Tryon was only sent to minimize the danger. Such a statement does not do credit to our Agricultural Department. The value of the New Guinea canes already in the colony had not been definitely determined when the new importation was decided upon. Surely it would have been wise, if there could be no certain provision against the importation of pests or diseases, to postpone the fresh introduction until the value of the old one had been arrived at. The sugar industry is of too much importance to permit of the happy-go-luck introduction of pests or disease, simply because we cannot be sure that the cane is unaffected. We do not hesitate to say that it would be better to introduce no cane at all from New Guinea, if we cannot be sure that the cane is of exceptional value, and is not likely to bring with it some pest or disease, that will do more harm than the cane will confer benefit. We have on more than one occasion alluded to the duty of the Government in the matter of cane diseases and pests, and the present occurrence lends emphasis to what we have said. The maintenance of our industry demands State action, where the danger is not such as can be dealt with by individuals. It is impossible to keep up a reputation for taking an interest in agriculture, when the most obvious legislation is neglected. Upon two occasions a bill has been before Parliament dealing with the question from an entirely superficial standpoint. As a remedy for diseases or pests it is suggested to give an officer of the customs power to order the destruction of a crop. We have yet to learn in what way the customs officials are trained for such work. A really comprehensive measure is required, and the Government will be failing in its duty to the country should it make no attempt to place such an enactment upon the statute book.—*Queensland Sugar Journal*.

—————:o:—————

### KOLA NUTS AND THEIR CULTIVATION.

[BY FRED. B. KILMER, CHEMIST, NEW BRUNSWICK, U. S. A.\*]

The kola nuts, as found in the American market, come mainly from Africa. The bulk of the West India nuts are consumed by the inhabitants of the islands where grown; a

\* Abstract by the author of a lecture delivered at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, January, 1896.

very small part of the crop is shipped to Europe. Lately, small supplies have reached our market from this source. No accurate estimate of the extent of the world's supply, nor the possible yield for this drug, can be given. The official reports of the African trade give from 2,500,000 to 3,000,000 pounds per year, which is largely utilized for home consumption. Those who are familiar with tropical products can realize the difficulties and peculiarities of the market in such a commodity. It is carried on mainly through native women. There is a certain amount gathered for home demand. The quantity that will reach the shipping ports must depend upon the caprice of the natives, and especially as to how much they stand in need of rum or tobacco. The crop must all be carried, often hundreds of miles, in head loads, through miasmatic forests, over impassable streams, across pathless mountains, under a tropical sun. The conditions are such that, to gather a ton of nuts and safely land them on a ship that plies along Africa's sunny shores, is a task that one would shrink from after a survey of the field. The native gatherers are shrewd dealers, even if not well skilled in the arts of civilized commerce. They know how to corner supplies, to create a rise in price; and they also know that, when a European buyer wants the nuts badly, grades that have no value at home will find a ready market. This accounts, in part, for the quite variable nature of market specimens. In the West Indies, the government encourage the cultivation of the plant, and, before many years, ample supplies from this source will be obtainable. In our own country some attention and discussion has taken place, looking towards its cultivation on our soil.

The kola plant seems to grow well in any climate where there is plenty of rainfall and a warm, tropical sun. Of course, the hotter and more moist the climate, the better. Wherever bananas, nutmegs or cocoa will grow, it is safe to say this tree will thrive. The best kind of soil is that which is deep, rich and clayey, although it will grow in a great variety of soils. In some of the West India Islands it may be found as high as 5000 feet above the sea level, but the best specimens are generally found about 1000 to 2000 feet elevation. If the situation is low and damp, the ground must be well drained. The young plants may be obtained directly from the seed,

planted in the field where they are to grow ; but the best results seem to come from planting the seeds in nursery beds, transplanting them when plants are from 2 to 3 feet in height. The seeds, as usually obtained from growers, are packed for shipment in boxes covered with earth, and the whole wet with fresh water. Holes are bored in the boxes for ventilation. The nursery beds in which they are planted are made of loam, peat or leaf mould and kept shaded. In nursery planting the seeds are put in the bamboo pots commonly used in the tropics, and placed from 9 to 12 inches apart. It takes three to five weeks before the sprouts appear above the ground. When ready for transplanting, they are set a distance of about 25 feet apart. If the soil into which they are transplanted is not rich, the best planters dig holes several feet deep—5 feet each way around—and fill in with the topsoil. It is necessary for the young plant to have shade. Many intelligent planters, who have lately taken up the planting of kola, use the banana for the purpose. The banana is very rapid-growing. It shelters the young kola plant and makes a profitable crop while the kola is coming into bearing ; kola, in turn, will begin to yield by the time the banana has exhausted the soil. The bananas are planted 10, 11 or 12 feet apart, with the kola at every second banana in the direction of the line. Thus, a plot of 20 feet square is enclosed with banana trees with four kola plants at the corners, leaving the kola from 20 to 34 feet apart. In sheltered situations, as in a low valley between hills that have a growth of woods, the banana is omitted in the center of the square, to give more light and air. The gradual thinning out of the banana is made as the kola acquires increased growth. Kola is usually planted at the beginning of the wet season. Grown wild, it commences to yield fruit about the fifth or sixth year. Well-cultivated specimens often begin to bear considerably earlier. In the wild state they reach full bearing in the ninth or tenth year. When the kola tree attains full size, it is customary with planters to place in the field with them small varieties of coffee, or some vegetable plants such as peas or yams. Kola gives the necessary shade. The stems and leaves of the other plants furnish a good fertilizer. By this method a kola plantation costs nothing except for the first planting. Kola does not appear to exhaust the soil as does the coffee, banana, orange, etc. Upon once attaining its growth it appears to be of permanent value. Specimens that have borne for fifty years and probably longer have been noted. Independent of its value for the nuts, kola is an excellent shade and timber tree, and is utilized for this purpose. A conservative estimate of the yield is 120 pounds

of dried nuts, or over 250 pounds of green nuts per tree, or from 8000 to 10,000 pounds per acre. No such amounts, however, are gathered in any portion of the West India Islands owing to the unsystematic and haphazard measures employed in harvesting the crop.

Taking up that part of the plant probably of the greatest interest, the seed or nut, we may examine the pods, which we will find contain from two to twelve nuts or seeds, so closely pressed together in growing as to be crowded into various shapes. The cellular tissue of the pod before drying is filled with a very slimy, stringy mucilage that is largely observed upon ripening. A singular fact noticed about the seeds is the fact that red and white nuts are found side by side in the same pod. So far as my observation goes, pods may be found that contain all red or all white, but no trees give all white or all red seeds. The native users lay great stress upon the difference between the white and the red kola nuts. Symbolically, the white nuts means peace, happiness, veneration, acquiescence to overtures. The red nuts mean the reverse: war, ill-will, challenge, rejection of overtures, etc. In some instances the white seeds command the higher price, being in repute as giving greater and better effects. In the dried nuts found in our market it is difficult to distinguish between the white and red varieties. Oxidation during the drying of the seeds gives to both about the same yellow-brown color. When subjected to the action of solvents, white or red nuts (dried) yield to water, alcohol, acetone or glacial acetic acid, shades of orange and yellow which are so nearly alike that considerable practice is necessary to distinguish between them. The coloring matter of the red nuts is, however, very soluble in dilute mineral acids. The white and red varieties may be distinguished by macerating for twenty-four hours in dilute sulphuric or hydrochloric acid when it will be found that the acid extraction of the red kola is a beautiful red rose, while that of the white seeds is of a light straw color. Heckel has shown that if the acid extraction is made alkaline with ammonia, that from red nuts assumes a purplish violet; that from white an ochre like color.

Several observers have noted that the red nuts give a larger percentage of moisture; Heckel gives 46 per cent. for white, 56 per cent. for red. The same author claims that the white seeds contain 5 per cent. more caffeine, 7 per cent. more of the peculiar principle, kolanin, than the red. My own experiments tend to confirm the observation that there is an appreciable difference in the amount of glucoside found in the white seed as against that found in the red.—*Jamaica Bulletin*.