

THE HAWAIIAN
PLANTERS' MONTHLY

PUBLISHED FOR THE
PLANTERS' LABOR AND SUPPLY COMPANY
OF THE HAWAIIAN ISLANDS.

VOL. XV.] HONOLULU, SEPTEMBER, 1896. [No. 9.

THE latest quotation of sugar in New York, September 6, was $3\frac{1}{4}$ cents for Cuban centrifugals 96 test. The European beet crop promises now to be very large, and may operate to prevent any advance in the near future.

THE sugar crop of New South Wales, it is estimated, will exceed 300,000 tons. What effect the reduction of the duties on sugar in that colony will have on future crops grown there is not stated.

THE largest dammed body of water in the world will be secured by the building of a dam at Clovuet, Minn., on the St. Louis River, 900 feet long and 80 feet high, by which back water will be extended sixty miles.

THE views of the Mexican Minister of Finance, regarding the working of silver coinage in Mexico, should be carefully read, and indicate what may happen in the United States, should the free silver party succeed in the November elections. [See page 406.]

OAKLAND, Cal., claims to be the healthiest city in the world, or, at any rate, in the United States. The death rate has

fallen since 1882, when it was 13.56 a thousand. Last year it was 11.85 a thousand. This approaches the sanguine sanitarian's ideal of 11 in a thousand.

AFRICA is the true home of the coffee plant, and in many parts of the continent it is found growing wild in profusion. A member of a Congo expedition states that in all parts of the forest he had visited, wild coffee was so abundant and so excellent that the expedition left their tins of imported coffee unopened.

Sugar Beet says that fifty years ago it was possible to rent the best Prussian farm lands for \$5 an acre; that they now rent at \$10 to \$15. These same lands give employment to double the number of people and feed three times the number of animals formerly employed and fed. This has resulted solely from the growing of beets.

THE *Sugar Beet* suggests a new and very simple method for cleaning the tubes of tripple effects, by placing small hollow balls in each tube. These, having a free motion, keep the tubes in perfect condition throughout the season. The operation is so simple that it can readily be adopted in any factory, and, if successful, will save much labor and time.

WHAT is claimed to be the largest boiler in the United States has recently arrived in New York for the New York Steam Heating Company. It is a Climax boiler, and weighs 119,000 pounds. A special car was constructed to transport the boiler from Warren to New York, and forty horses were required to draw it to its destination in the city.

THE drying of fruit, which requires great care and a certain temperature, offers a promising field for electric heating. Fuel for heating by steam is often expensive, but fruit districts usually have abundant water power that could be used for driving dynamos. The electric current would prove serviceable in a variety of ways in addition to heating.

THE sleeping-car magnates are giving in just a little to the people. The Chicago and Great Western has given notice to

the chairman of the Western Passenger Association that, on a date to be announced later, it will accept second-class tickets in first-class Pullman sleeping cars. The competition of tourist sleeping cars on other roads has compelled this concession.

THE more remote ancestors of whales undoubtedly had legs. The sperm whale possesses a rudimentary thigh bone and tibia. There seems to be no question that the progenitors of modern whales were land animals, but their descendants took to the sea and ceased to retain their original habits and structure. So says an exchange.

JAVA planters ferment their coffee before pulping. This, it is claimed, enables better pulping to be done, and produces coffee brighter in color and of better quality. This accounts, says our contemporary, for the difference in coffee received in London, some being of a nice yellow appearance, fetching the best prices, and others extensively coated with silver skin and of a dingy and dull color.

THE French Government have issued a decree raising the customs duties on foreign sugars. The measure took effect from the 1st of August—the day when the new German legislation on export bounties came into force. The regulations permit the Government to act by decree, with reservation that the step shall be ratified by Parliament. The duty will be increased from 7 f. to 10.50 f. for raw, and from 8 f. to 12.50 f. for refined sugars.

A LATE New York exchange says: "All enterprise is checked by fear of a currency revolution and changes in the policy of the Government. Trade languishes, manufactures are checked, and everybody is sailing close to the wind—in fact, many are merely drifting. The week past has been a dull one. Low prices continue to prove unattractive to buyers, or to offer any inducement to purchase beyond positive requirements."

DR. MAXWELL, Director of the Hawaiian Experiment Station, returned from Kauai on the 20th, having spent a month

on that island, during which he visited each of the sugar plantations, and made such investigations relative to the growing crops and the mill works, as were brought to his notice by managers and others.

WE would call the attention of sugar men as well as farmers to the admirable statement of Dr. Stubbs relative to the chemistry and mechanics of plowing on page 401;—also to the “Notes on Sugar in Hawaii” by Dr. J. Hastings Reid, who visited these islands last year, and whose suggestions and comments are well worth consideration. Also the attention of dairymen to the practical notes for farmers on page 408, showing the value of good herds of cattle.

HERE will be found a statement of the money in circulation in the United States July 1, 1896 :

Gold coin.....	\$456,128,483
Standard silver dollars.....	52,175,998
Subsidiary silver.....	59,999,805
Gold certificates.....	42,320,759
Silver certificates.....	331,359,509
Treasury notes, Act July 14, 1890.....	95,217,361
United States notes.....	225,451,358
Currency certificates, Act June 8, 1872.....	31,840,000
National Bank notes.....	215,331,927
Total.....	\$1,509,725,200

QUEEN VICTORIA has lived long enough to know what is good. It is said that all the apples used in her household are grown in the United States, being obtained exclusively from New England. The apples sent are of the kind known as the “Albemarle Pippin,” and they are specially packed in polished barrels with the small United States flag and an English union jack painted on the top. They are shipped in quantities of a dozen barrels at a time, and Her Majesty has been obtaining her supply of apples from the United States for nearly twenty years.

It has been customary to propagate the sugarcane only by cuttings, and the consequent lack of seedlings has, in many sugar districts, been a great hindrance in the way of improvement. In East Java, from the 200 or 300 varieties experimentally grown, Mr. J. H. Walker, of Singapore, has been

able to select a few plants that, by crossing, have given very good seeds. From these vigorous seedlings have, we understand, been raised. It is found that these plants yield more sugar than either the parent plants or cuttings from them.—*Produce World*.

AN experiment is being made in Holland in profit sharing with the farmers, who furnish beets for a leading sugar factory. There were 45,000 tons of beets worked last year, and, after certain deductions were made, one-half of the profit that remained was divided *pro rata* among the farmers who furnished the beets. The stockholders of the factory got 5½ per cent. on their investment, and the farmers about \$4.80 per ton for the beets, they averaging nearly 14 per cent. sugar. If there were no profits and the beets tested 12 per cent., the farmers were to have \$3.50 per ton for the beets.—*West Indies Home Builder*.

DOCTOR OF ENGINEERING.—At the commencement exercises of the graduating class of '96 from the Stevens Institute of Technology, Hoboken, N. J., held June 18, 1896, the degree of Doctor of Engineering was conferred by the faculty and trustees of the Stevens Institute upon Commodore George W. Melville, Engineer-in-Chief of the United States Navy, in appreciation of the excellent engineering work performed by Commodore Melville for his country, and his advancement of the science of steam engineering, well illustrated in the world-wide famed "White Squadron."

THE United States Court of Appeals, sitting in San Francisco, California, has decided that the Paris awards on matters pertaining to sealing in Behring Sea must be upheld as the supreme law of the land, and that the United States Government has no right to make special laws governing its citizens in hunting seal that do not permit them equal privileges with the citizens of foreign countries on the sealing grounds. The decision is important, as it defines clearly for the first time the restrictions to be placed upon American seal hunters in Behring Sea. This is a notable acknowledgment of a board of arbitration.

THE Government of Bolivia is striving to support the sugar industry. There has been lately published a decree which enacts: 1. That the Government will grant a guaranteed interest of 4 per cent. upon the capital expended in the erection of steam sugar machinery, which is regularly employed during each year in the making of sugar, the guarantee to continue for five years, and to be payable at the end of every six months. 2. A bonus of \$4000 (Bolivian) will be awarded to each manufacturer who produces over 4000 quintals of sugar each year. 3. Bounties of three classes—\$2000, \$1000 and \$500—are awarded each year to refineries which are adjudged to have adopted the most perfect methods of conducting their operations and have produced the best grade of sugar.—*Sugar.*

DURING 1894, as a nation, says the *Chicago Advance*, we spent, for alcoholic spirits alone, \$609,000,000 or \$5,000,000 more than all the appropriations of Congress combined. To this must be added more than \$617,000,000 for beer, making a total of \$1,226,000,000. This provides 100 glasses of whisky and 220 glasses of beer annually for each inhabitant between the Pacific and the Atlantic. In striking contrast with this enormous expenditure, the nation received as internal revenue tax less than \$100,000,000. In the light of these facts, is it too much to say, the liquor traffic constitutes the age problem—politically, socially, industrially, financially and religiously? It is the greatest question before the people.

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FRUITS FOR EXPORT.

Anyone who travels abroad cannot help noticing an increase in the use of fruits as an article of daily food at all seasons of the year. By the aid of rapid steam communication, and still more by the provision of cold storage, afloat as well as on shore, the luscious tropical fruits—formerly eaten as luxuries—can be had in northern climes almost as fresh, at any season of the year, as where they are grown, and at quite reasonable cost. The demand is constantly increasing and extending to countries where formerly few of these necessaries of life and preservers of health were called for.

Their value consists as aids to digestion, in which no other kind of food can compare. While fresh apples, pears, plums, grapes and other fruits of the temperate zone, are valuable in this respect, they can serve abundantly only during the autumn months, while, for the remaining portion of the year, tropical fruits become an indispensable supply for all countries.

During a recent visit to the American coast, we noticed a marked improvement in the appearance of the bananas offered for sale in the fruit stores. Those packed in boxes are generally opened in fresh and unbruised condition, and as the bunches hung in the stores the fruit seemed as fresh as though it had been gathered only yesterday. Vessels in the Jamaica fruit trade are fitted with beams on which the bunches hang, and usually they are carried across the ocean with very little chafing of the fruit, which is deposited in cold storage buildings until disposed of to the trade. Both dealers and consumers give a preference to our Hawaiian Chinese bananas, both for eating and keeping qualities, over either the Central American or West Indian varieties, except when they cultivate the same kind as ours. The superiority of the Hawaiian banana as a table fruit is chiefly this: that it has a finer taste, and, when fully ripe, it can be safely eaten by young and old alike; and even for nursing children and bed-ridden invalids, it is not only harmless, but the most nourishing fruit that can be eaten. For invalids, however, bananas in the form of flour is considered a still more valuable food.

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PRICES OF FOOD IN MEXICO.

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In the last issue of the American Grocer a correspondent in Ohio asked for some information relative to prices in Mexico. A letter has been received at Republican National Headquarters which gives the desired information. It was written by R. F. Campbell, Mayor of El Paso, Tex. He says:

I have made careful and thorough inquiries into the wholesale price of some common articles of merchandise in the city of El Paso, Tex., and the city of Juarez, Mex., just across the Rio Grande, and at this date—August 7, 1896—the prices of the following articles in the two cities are as follows (those

on this side of the river being reckoned in United States money and those on the other side in Mexican silver):

	U. S.	Mexican.
Breakfast bacon, $\text{\$}$ lb.....	11½	32
Ham, $\text{\$}$ lb.....	11½	32
Matches, $\text{\$}$ gross.....	60	1.20
Pickles, in 5-gallon kegs.....	2.25	6.50
Vinegar, in 5-gallon kegs.....	60	1.40
Baking soda, $\text{\$}$ kozen.....	2.06	2.40
Salt, in 2-lb sacks.....	40	90
Macaroni, $\text{\$}$ lb.....	10	25
Royal baking powder.....	4.00	9.00
Molasses, $\text{\$}$ gallon.....	75	1.60
Beans, $\text{\$}$ lb.....	3	17
Cheese, $\text{\$}$ lb.....	19½	29
Cnawles, $\text{\$}$ box.....	5.00	11.75
Catsup, $\text{\$}$ dozen.....	2.75	6.25
Jelly, $\text{\$}$ dozen.....	2.00	5.00
Dry plums, $\text{\$}$ lb.....	11	25
Dried apples and peaches, $\text{\$}$ lb.....	11	25
Dried prunes, $\text{\$}$ lb.....	10	20
Corn starch, $\text{\$}$ dozen.....	1.06	1.90
Lemon extract, $\text{\$}$ dozen.....	1.00	1.90
Vanilla extract, $\text{\$}$ dozen.....	2.25	3.00
Arbuckle's coffee, $\text{\$}$ lb.....	20	40
Soap, $\text{\$}$ box.....	3.75	5.00
Tea, $\text{\$}$ lb.....	35@1.00	70@1.50
Deviled ham, $\text{\$}$ dozen.....	2.90	6.50
Sugar, $\text{\$}$ sack of 100 lbs.....	5.50	10.75
Flour, $\text{\$}$ sack of 100 lbs.....	2.25	8.50
Rice, $\text{\$}$ lb.....	5	11½
Canned tomatoes, $\text{\$}$ case.....	2.25	7.90
Crackers, $\text{\$}$ lb.....	7½	21

The Mexican prices are the rates which prevail in the free zone, on which there is small duty. Of course, in the interior they would be higher. I also find that Mexican labor in Mexico, in the larger cities, is paid from 64 cents to \$1.50 a day in Mexican silver. The highest price for the very best and most skilled labor is \$2 per day in the same kind of money. In the interior of Mexico, in the country and the smaller cities, the wages paid are from 20 to 30 per cent. lower than that given above.

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In the north of India, says the "Planting Opinion," the lantana now threatens to become the most potent factor ever known in the restriction and even destruction of forests. It is spreading with marvellous rapidity, and there are serious thoughts of waging a campaign of extermination against it. Whatever they mean to do should be done quickly, or it will not be long before it becomes, for good or for ill, absolute master of the situation.

FARMERS WHO SUCCEED.

Farmers are divided into three classes, says the California Cultivator. First, those who take up with everything new in grains, vegetables, fruits and machinery without stopping to think or studying the demands of their market, the possibilities of their soil and the peculiarities of the climate. Invariably they make failures. The second class are those who never buy or produce anything new in the way of grains, etc., use the same implements their fathers did, irrigate when the spirit moves them, let their cattle run around the straw pile in winter, feeding them a few nubbins; make all their own butter in summer and use the old dash churn. They are homely likened to a cow's tail, inasmuch as they are always behind.

The third class are those who think, study their markets and soil, begin on a small scale and experiment until the problem is solved. If a new fruit is being advertised and trees sold at enormous prices they buy but one and see if it suits their soil and climate. They will not plant a peach orchard in a swamp nor a cherry orchard on an alluvial soil underlaid with gravel. This class is the one that is making money at farming—the other two are in the background. One and two are both bound for the same place, but seemingly traveling in opposite directions.

One acts without thinking; the other thinks without acting. One is extravagant in buying unnecessary things; the other extravagant in not buying necessary articles. One has no fixed method of labor; the other's methods of labor fixes him. These two classes are an anomaly, and as Lamartine said of Robespierre, are "shadowy, undefined—mixed." Not so with those designated as the third class. They have an aim in farming, and as a result have a well defined plan and combine brain and muscle—theory and practice—know the old way, but adopt the new and are a success. In the new agriculture of the far West these farmers are legion and are rapidly coming to the front. They believe in the modern theory of advancement as applied to agriculture and are bettering their condition by working along these lines. The

methods of the past generations will not do for the improved order of things that mark the pathway of other men who are a great success in this world.

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NOTES FROM HAMAKUA, HAWAII.

The grinding season this year, in this district has been the longest ever known, and some of the mills may not shut down at all. Most of them, however, will have a month or two for doing necessary repairs. The Ookala mill has the largest crop this season that it has ever taken off. It is now in good condition, and will soon be placed on a paying basis. The crop at Kukaiau was not a large one, but the coming crop will exceed, almost twice, what has been raised in former years. Extensive alterations are now being made in this mill to meet its new requirements, and to run night and day, if necessary. The Hamakua plantation has about 7500 tons of sugar, a very large crop for that plantation. The mill is run under thorough chemical control; the cane, trash, and juice being weighed, the juice weighed with a Baldwin weigher. The water is also measured by a water-meter, that is used in maceration, and everything is done that is possible to do, to get the necessary data for ascertaining the extraction, the amount of fiber and sucrose in the cane, and the loss in manufacture. Among the improvements of this mill is an automatic liming machine which works like a charm, and is said to be far ahead of hand-work.

At the Paauhau plantation the output of sugar will be over 9000 tons, and the grinding will not be through until next crop is ready to harvest. Honokaa plantation has also a large crop, over 6000 tons of sugar. Kukuiahaele plantation is also to the front with a good crop, over 5000 tons, the largest ever taken off there.

All the mills in this district are doing good work, and those which have adopted the seven-rollers, or the shredders, are doing extra good work. But while these machines have proved a decided improvement over the five-roller mill, they still fall behind the nine-roller. There is another combination which does excellent work, and that is the two three-roller mills and a shredder, but even the work done with

these cannot begin to compare with mills of large and better design.

The following data will give an illustration of the advantage of the latest improvements in crushing cane. For instance, Kohala plantation, 1895, with an old five-roller mill with 15 per cent. sucrose, dry grinding, begasse contained 5 per cent. moisture; $7\frac{1}{2}$ to $8\frac{1}{2}$ per cent. sucrose; extraction 85 per cent. sucrose. With 12 to 15 per cent. maceration, begasse contained 52 to 54 per cent. moisture, 6 to 7 per cent. sucrose, 87 to 88 extraction. The new nine-roller mill, 1896; dry grinding, begasse contained 42 to 44 per cent. moisture, 4 to 5 per cent. sucrose, extraction 90 per cent. sucrose. With 12 to 15 per cent. maceration, begasse contained, moisture 44 to 45 per cent., sucrose $3\frac{1}{2}$ to 4 per cent. extraction, 94 to 95 per cent. sucrose. This is a splendid showing for the nine-roller mill, and it is not too much to say, that it will eventually, be generally adopted.

This mill, however, is not really a nine-roller mill all combined in one, because the old three-roller is still retained and a six-roller mill is added to replace the two rollers. But this six-roller mill is of superior design and material, and having large shafts, double pinion, hydraulic attachments, steel gearing, and is fitted with all modern improvements, it works as smooth as a charm. This is now one of the best mills on this island, and the work done by it can not be surpassed anywhere.

At the Kohala mill I noticed among other things, a device for cooling the juice that is left in the cleaners over night, and which is said to check fermentation. It consists of a coil placed a little below the top of the juice, and through which cold water circulates until the juice is brought to the desired temperature. Mr. Forbes, of Kukuihaele plantation, has also another style of cooler. It is twelve feet deep with gate at the bottom, and the molasses is said to grain up better than in the more shallow coolers. Mr. Moore at Paauhau is about to put in place an immense iron tank with gates in the bottom to hold No. 4 sugar. At the Hamakua mill, a new cane cutter has been put in place which seems quite an improvement, and which is said to not only increase the extraction, but enables the mill to do much more work.

At the Kukaiau mill a cane cutter will also be put in place for the coming season, and quite a number of other mills are about to adopt this device.

The cane throughout this district is in fine condition on all of the plantations from Ookala to Kukuihaele, and a large output of sugar may be looked for the coming season. In Kohala, the cane is also looking well, and some of the best is seen on the old Halawa plantation, which is due more to good methods of cultivation than to artificial fertilizers. The output of sugar for Kohala district will from present appearance surpass any previous year. All the plantations of these districts show evidences of careful management, and superior methods of cultivation, and in all the mills one sees improvement and good work. It is a pleasure to visit them, and mill men as well as others may profit by inspecting them. O.

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HOW FREE SILVER WORKS IN MEXICO.

His Ex. J. I. Limantour, the Mexican Minister of Finance, arrived in St. Louis recently, and talked freely with a *Globe-Democrat* reporter of the existing conditions in Mexico under the silver standard. He drew comparisons between the laboring man of the United States and Mexico, and showed how a free silver monetary system would affect the United States.

“Legally we have a double standard in Mexico,” said Mr. Limantour, “but practically it is a silver standard, as there is no gold in circulation. Every ounce of gold we produce is immediately drawn out of our country by foreign nations. We coin silver at the ratio of 16½ to 1. We do not coin gold, but as quick as it assumes its bullion form it leaves Mexico or is locked up in our vaults as the property of foreigners. Mexico has had four gold bond issues since 1888, and a number of domestic silver bond issues. The gold bond issues aggregate about \$100,000,000. Most of the bonds bear six per cent. interest. The interest on the gold bonds amounts to about \$6,000,000 in gold annually, but when the time comes around to pay the interest we have to give up \$12,000,000 of our money. So we really pay double interest on our

loan, or twelve per cent. in silver. Then the question presents itself, what amount will it take to redeem the bonds at maturity? It's a guess now as to what we will owe at the time of redemption. If silver goes up we will owe less; if it goes down it will take so much more of our money to pay our creditors. It's all according to what our dollar will bring in the markets of the world.

“What Mexico wants most today is a fixed price for silver. What we fear most are the continual fluctuations of the white metal. With silver up and down alternately our merchants cannot make calculations for future transactions. In a commercial sense we live from day to day. The merchant in Mexico would place his business in jeopardy if he made a contract covering what is looked upon as a reasonable time in the United States. As a result, the Mexican merchant is extremely conservative. He buys only what he actually needs, and when silver fluctuates violently, as it often does, the Mexican merchant is obliged to draw back and wait until he can see his way clear to a purchase which will not prove a boomerang at the next day's quotation of silver. This condition of affairs naturally leads to a general conservatism in all lines. Our commerce is restrained, as we must naturally proceed with the utmost care and caution in all our business ventures.”

What is the comparative condition of the laborer of Mexico and the United States? was asked.

“The conditions in the two countries are different,” replied Mr. Limantour. “The farm hands in Mexico get between 25 cents and 40 cents a day in silver; but as most of them are Indians, they have no great needs and are content with low wages. The Mexican laborer is content to wear clothes made of cotton. The lower class of laborers are satisfied if they have for daily fare corn, beans, a little meat and bananas, which abound in great numbers. The average laborer cannot afford imported products, such as good furniture. The highest wages are made by artisans from other countries, engineers, masons, etc. They get from \$3 to \$5 a day, of course, in Mexican silver. Tinware, ironware, dishes and furniture and farming implements, especially the improved machinery, are very high in our country.

Supposing a carpenter who makes \$2 a day in the United States goes to Mexico, and under your silver standard makes the average wages, could he live as well in Mexico for the money he earns as he does in the United States? was asked.

"He could not," was the reply. "He could buy about as good food as he does in the United States, but he could not with the wages he earned in Mexico live as well in other respects. He would have to wear inferior clothes and use poorer furniture. Mexican workingmen don't live in such well furnished houses as American laborers.

"No single country can successfully uphold a double standard system at an independent ratio," said the Mexican Minister of Finance. "A double standard cannot be maintained with free coinage of silver at a ratio of 16 or 16½ to 1. The moment free coinage at either ratio is declared that moment marks the beginning of a movement which ends in the drainage of every dollar of gold from the country. That is what has happened in Mexico, and that is what will happen in the United States. So long as the United States kept enough gold in its treasury to counteract the heavy withdrawals everything will be all right, but the serious side of the situation will present itself when the gold gives out."

How would Mexico be affected by the free coinage of silver in the United States?

"Mexico would at first be injured, on account of the great fluctuations which naturally follow a declaration of this character, but in the long run Mexico will be benefited by free coinage in this country."

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PRODUCTION OF COFFEE IN BRITISH DEPENDENCIES.

[LONDON TIMES, AUGUST 1.]

SIR,—There is a great deal of apprehension current in reference to our old Ceylon staple (coffee), its production and price—which, with your permission, I should like to correct.

The other day Lord Stanley, of Alderly, addressing the House of Lords, included "coffee" in his list of products suffering from depreciation in price, although for the past eight years at least coffee has been pre-eminently the tropical

product which, contrary to the theory of bimetallists, has not only maintained, but increased its gold value in the markets of the world. Thus, in 1889, the lowest and highest quotations for middling plantation coffee in London were 91s. to 102s., and they have not since fallen below that figure, while for 1895 the range was 100s. to 107s., and there is little difference this year. This is due to the fact that production has not kept pace with the demand for the continent of Europe and North America; and yet here again a curious misapprehension prevails as to there being an immediate risk of over-production of coffee as of tea. Thus, at the recent reading of a paper before the Royal Colonial Institute on "The Development of Tropical Africa," by Sir George Baden-Powell, in the discussion that followed, Dr. Morris, of Kew, stated that "in the regular cultivation of coffee, cacao, cotton, kola and fruit, West Africa has a great future before it." And in describing the coffee industry of Nyasa hill country (British Central Africa), I made the remark: "The chief staple, coffee, is one of which there is no fear of over-production at present." Nevertheless, the chairman (Sir R. W. Herbert), in summing up and referring to tropical products, said: "It is desirable, as far as possible, to seek for new staples rather than to crowd the markets with ordinary produce like tea and coffee, which seems in danger of being over-produced."

Sir Herbert is correct as regards tea, but he has overlooked the great falling off in the production of coffee within British dependencies during the past sixteen years. This has been mainly due to the terrible effects of a fungus enemy on the coffee of Ceylon, a great part of Southern India, and even Java. Without going into details, let me venture to give approximate and contrasting estimates of coffee exports from British dependencies:

	Maximum annual export 16 to 18 years ago.	Estimate for 1896
	Cwt.	Cwt.
Ceylon	1,000,000	50,000
South India.....	150,000	240,000
West Indies.....	150,000	80,000
Straits and North Borneo.....	30,000
	<hr/> 1,700,000	<hr/> 400,000

This indicates a woeful deficiency, and I see no prospect of

more than a very limited increase for many years in the above dependencies. I am free to confess that, at the same time, Brazil has maintained, and even increased, its large production of coffee; but this has been counterbalanced by the notable falling off in the crops of Java and Netherlands-India generally; and were it not that American and European capitalists have been developing coffee plantations in Mexico and Central America (Guatemala, Costa Rica, etc.), the consuming markets would have been barely supplied. The continued high price has, indeed, encouraged Ceylon tea planters to invest surplus capital in a new coffee district in East Java; while I am aware that city capitalists are looking to foreign States in South and Central America for coffee investments.

Surely, then, experiments in coffee cultivation may well be encouraged in the British divisions of Africa (as well as the Malayan Peninsula, North Borneo, etc.), and more especially in British Central Africa under Sir Herbert Johnston's enlightened administration. The first limited company for coffee cultivation in Nyasaland was formed a year ago in Ceylon by planters and merchants, whose manager, now hard at work opening up a plantation, gives an encouraging report of his prospects in labor supply, crops, etc.

It will be a long time, however, before such enterprise, or any other enterprise at present within British territory, can seriously affect the coffee market; and I see no early prospect in any other quarter of an over-production of coffee. The case is rather different with tea, in view of the large areas planted and still being opened in India and Ceylon. The export of tea from India has steadily risen, year by year, from 2½ million pounds in 1861-62, until the estimate for 1896-97 is 144 million pounds. In the case of Ceylon we began with 23-lb. export (twenty-three years ago); in 1873 and for 1896 the official estimate of total exports is 102 million pounds.—*J. Ferguson, editor Trop. Agriculturist.*

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A FRENCH savant says many perfumes aid health by destroying disease microbes. Thyme, lemon, mint, lavender, eucalyptus and other scents prove useful. This is worth trying.

CHEMISTRY AND MECHANICS OF PLOWING.

[SYNOPSIS OF A LECTURE DELIVERED BY REQUEST BEFORE THE NORTH LOUISIANA AGRICULTURAL ASSOCIATION, BY DR. WM. C. STUBBS.]

This subject, if followed in all of its ramifications, covers nearly the entire course in agricultural chemistry, as well as a short treatise upon simple mechanics. Even vegetable physiology must be partially noticed, since the grand and primary object of plowing is to produce such conditions in the soil as shall conduce to the most rapid development of the cultivated plants in a given time.

In the hour allotted, however, only a few salient points can be noted, and these will be reviewed with great haste. There are two series of ever active forces in nature, the one constructive, the other destructive. They operate alike upon the three great kingdoms, mineral, vegetable and animal. These forces are gravity, heat, water—alone, as a vapor, liquid or solid—water charged with carbonic acid, oxygen of the air, chemical affinity, vitality, and ferments. The latter may be regarded as a low order of vitality.

These forces have produced all of the changes on the earth's surface, and are still acting with undiminished intensity, causing transformations in the natural spectacular drama daily unrolling before the gaze of observing humanity. The internal heat of the earth, the deposition by moving water of rock material, subsequently solidified or crystallized by pressure, and other causes are constantly engaged in the process of rock making. As soon as rock appears, whether of igneous or aqueous origin, the destructive forces begin the work of disintegration, preparatory for the support of vegetable life. First a few lichens, then mosses, then grasses and weeds, and finally shrubs and trees. A more or less complete disintegration of the rock, as observed by the unaided eye, is finally presented to the envious inspection of the prospective settler. While this disintegration, *in situ*, is occurring, the falling rains and moving waters are busy in transporting, assorting and depositing much of this disintegrated material at lower levels, and finally we will have large areas of alluvial soils encroaching upon the ocean's domain, and enlarging the territory of cultivable soils. As

soon as these layers of alluvial material are superimposed the one above the other, to produce sufficient pressure, rock-making again begins, and, if undisturbed, insipient shales, slates, sandstones, etc., will ultimately be produced. This transformation is first exemplified in the hardpan which occurs underneath nearly every soil which is cultivated with shallow implements.

With these preliminary remarks it will, doubtless, be apparent to many of you that our first and primary object of breaking soil is to arrest this tendency to rock-making, to open up the first twelve or eighteen inches of the soil to the disintegrating influences of air, water and vegetable matter. The character and size of the crops grown also determine the rate of disintegration; the larger and deeper the roots penetrate, the more effective they become in soil improvement. To secure the growth of plants with large and deep roots the soil must be deeply broken and stirred, for in this soil its roots must penetrate and live. It is their home, and easy permeability and a free access of air are absolutely essential for the full growth of roots of all kinds of plants. Again, the presence of air and the freedom of movement of water through the soil are also essential conditions for the elaboration of plant food from the rock dust which make up the bulk of all soils. Here, too, we realize the presence of the ever-acting forces of construction and destruction. "By ceaseless action all that is subsists," and the soluble plant food of today, if not utilized at once by the growing plant is quickly resolved into insoluble forms or washed out by excessive rains. The amount of soluble food available at any one time is determined largely, as I will presently show, by "tilth."

Another object in breaking or inverting soil is to destroy weeds or grasses, and thus relieve it of the foulness which an excess of vegetable growth always produces. Breaking land is, therefore, a cleansing process. But another object in breaking land is to control moisture. If the lands are inclined to be water-sobbed, they are usually thrown into high ridges, thus exposing the largest surface possible, with bare deep middles, insuring increased evaporation from lower depths, and furnishing surface channels for the escape of flood water

in times of excessive rains. Evaporation is a cooling process, and no soil can be made warm and fit for rapid growth of plants, which contains an excess of moisture. Therefore, breaking is often resorted to to relieve the soil of abundant moisture to produce heat and warmth necessary for plant vigor, and to permit the free circulation of air which is necessary for growth of roots and for the chemical reactions which must evolve soluble plant food. If, on the other hand, our lands are disposed to be droughty, barely affording water enough for a maximum crop, the reverse treatment is resorted to. The soil is now broken flat, each furrow is tamped upon the preceding one, forming a continuous blanket six or eight inches deep, so as to prevent the rapid evaporation which the nature of the soil would otherwise accomplish.

In this way such soils are kept moist. With soils of an intermediate character, such treatment should be given as will insure the most desirable quantities of moisture and heat needed for maximum growth. Soils vary largely in their capacity for moisture. The soils of Audubon Park, when saturated, will carry 51 per cent. of their weight in water without dripping, while those on this station (Calhoun) will barely hold 20 per cent. of their weight. It has been shown that the soils of the former are too dry to furnish the needed moisture to growing plants when they contain 12 per cent. of water, while the latter will successfully sustain plants down to $1\frac{1}{2}$ or 2 per cent. of their weight in water. These differences are due to the different percentages of clay, silt and sand which these soils contain. The larger the percentage of clay, the greater the capacity of holding water. *Vice versa*, the larger the proportion of sand—particularly coarse sand—the least its capacity for water. Since an excess as well as a deficiency of water is to be avoided, true loams (mixture of sand and clay) are, therefore, better adapted to most of the crops grown. It has been found that 50 to 60 per cent. of the water-holding capacity of every soil is the amount best adapted to rapid growth.

So much for the physics, the chemistry and the geology of breaking soils.

If this work has been intelligently performed, subsequent planting and cultivation are simple processes. If the process

of breaking has been badly performed, then subsequent cultivation must be directed not only to cultivation proper, but to the securing of tilth; that is obtaining the best conditions for the growth of crops.

Tilth, however, should be always obtained before planting, if possible, and then the after-cultivation is purely one of culture—that is of the maintenance of tilth.

Unfortunately, such a happy condition does not often prevail with our farmers. It is too frequently the case that furrows hastily thrown together form the receptacle for our seed, and, after the plant is up, it is permitted to contend for mastery with weeds and grass until the latter promises success, when a desperate effort is made with turning plows, shovels and hoes to bury and annihilate the latter, and the cultivated plant, left alone in the occupation of the soil, is yet stunted and surrounded by environments which will not conduce to the most rapid growth and development. Alas, cultivation is too often regarded as a process of destruction of weeds and grass, and is resorted to only for such purposes.

But cultivation should have no such object in view. 'Tis true that our variable seasons will occasionally fill our fields with grass and weeds in spite of our efforts, and, when filled, must be removed by plow and hoe; yet it is the universal experience of every planter that the crop is never improved by such treatment. It is simply a necessary evil, often brought about by neglect or over-cropping, but sometimes by such an extremely wet season as to defy human effort to prevent it. True cultivation should look only to the preservation of tilth which a proper preparation of the soil has established. It involves only two principles—the maintenance of the most rapid rate of nitrification and other chemical changes, and the conservation of the proper amount of moisture. Nitrogen is the most costly of the ingredients of plant food. It is also the most fugitive. It is derived chiefly from organic matter which, by a process of oxidation, is converted into nitric acid. The salts of nitric acid are extremely soluble, and, if not utilized at once by growing plants, are washed out by heavy rains. Hence there is a gradual development of nitric acid during the period of growth of plants, and the

process by which this oxidation of organic matter into nitric acid is accomplished is called nitrification.

This oxidation is going on in every fertile soil, and when stopped, even though the soil may be rich in vegetable matter containing nitrogen, the plants thereon must also stop their growth. What is necessary for nitrification? (1) Organic matter containing nitrogen; (2) a certain amount of moisture; (3) a free access of air; (4) a certain temperature; (5) a mild alkali with which the nitric acid can combine when formed; (6) the presence of minute microscopic organisms or ferments. With these conditions fully maintained, nitrification is most rapid and effective, and the growth of plants is just in proportion to its rate. It can, therefore, be readily seen how cultivation tends to maintain the proper conditions for rapid nitrification. Many beneficial effects of cultivation can now be easily explained. We cultivate shallow, because such a process not only prevents destruction of roots of the plant—*an evil always to be avoided*—but also because nitrification takes place in the upper layers of the soil, and by the act of cultivation the ferment is well scattered. Again, the temperature at which fermentation is most active is about 90 deg. to 110 deg., and this temperature obtains in the upper layers of the soil. The action of the ferment is suspended at or about 50 deg. and 150 deg. It is destroyed by high heat and electricity; hence, when lightning strikes a soil nothing will grow where struck for some time afterward.

The presence in small quantities of lime highly favors nitrification. Moisture in excessive quantities excludes the air and suspends the vital activities of the ferment; hence the necessity of drainage. The absence of moisture is equally as objectionable, and here the second object of cultivation promotes the first.

From these considerations it will be seen that frequent cultivations, provided no roots are cut, are favorable to rapid nitrification. Soils cultivated daily produce better than the same soils cultivated weekly, and the latter better than those cultivated less frequently.

Besides the beneficial effects of rapid nitrification, other chemical changes of great practical value are induced by shallow and frequent cultivation. The soil is a great laboratory, and the chemical changes taking place there are com-

plex and continuous, and frequent stirrings accelerate these changes and give increased available plant food. One practice must be emphasized here as both wise and expedient. *i.e.*, of breaking the crust after every rain, to let in fresh portions of air and to aid nitrification, but under no circumstances should it be done while soil is wet, since this destroys rather than aids the ferment.

The second object in cultivation is to conserve the moisture. On the approach of a drought, cultivators should be run very shallow and almost continuously. In this way the thin layer of earth removed from the great mass of the soil is laid as a mulch on the surface, and the continuous upward movement of the water through the soil into the air is checked just below the surface, and the roots of the plant can then appropriate it. The continuity of capillary pores are broken, and the water heretofore passing into the air is arrested just below the surface, and is conserved for the use of the plant. Hence plow continuously in dry weather. One other point: finely divided soils have the power (varying according to character from 1.5 to 23 per cent.) of absorbing hygroscopic moisture from the air, a not insignificant property in a prolonged drought with heavy dews at night. These are the reasons why we plow. Now what do we do it with? All instruments used for working the ground and producing tilth are classified as plows, and may be divided into four classes: Plows proper, for breaking, inversion of soil, sub-soiling, etc.; hand and horse hoes, for the destruction of grass and weeds; cultivators, which simply stir the soil for nitrification or conservation of moisture; and fourth, harrows and rollers.

The plow is an ancient implement. The Egyptians had an iron-pointed share, but no coulter or wheels. The Greeks added wheels to their iron-pointed shares. The early Saxons added the coulter to the wheels and iron-pointed shares, but it was not until the seventeenth century that the mould-board was introduced, which remained of wood until 1760, when supplanted by iron ones. Wooden mould-boards were used generally, however, until 1830. Today we have every form of plow suitable for every operation of the farm, made of the best chilled iron and steel, with any part replaceable at will.

Of turn-plows we have three general types : 1. A flat share and upright coulter, cutting a rectangular furrow, and reversing when it is used for sodding. 2. Crested or high-cut plows, with share raised on the wing side, and an under-cut coulter throwing a furrow whose cross section is a trapezium, and is used for winter plowing so as to expose the furrow to the largest influence of the freeze of winter. 3. Turn-plows, which throw wide furrows up against each other at regular angles and are used for tilth. Again, we have common plows which turn the soil; digging plows, like our scooters and straight shovels; swivel plows, which throw each furrow in same direction, and are popular on hill-side work; double mould-board plows, which throw two furrows in opposite directions at the same time; subsoil plows, which stir the subsoil without bringing it to the surface; and special plows, like the potato plow, the beet plow, etc., used for harvesting root crops.

Even the shape of the shear modifies the work performed. A slightly rounded, pointed shear will perform square work in open land, and a flat shear with short point is used in shaving land, and a long-pointed shear is used for breaking hard and stony land.

Cultivators may be arranged with grubbers; broad shears like your sweeps and scrapers and scarifiers, like our harrows and narrow bull tongues. Harrows are used to pulverize clods, smooth the surface and cover light and small seeds, and are a combination of plows. The roller is used to compact the earth and pulverize clods, and is a most useful instrument upon open soils.

In conclusion, permit a *resume*:

All soils are comminuted rock particles, and must be broken and exposed to the disintegrating agents, to prevent incipient rock-making, to furnish easy permeability to roots, and to yield soluble food for the plant.

Thus breaking is done by turn-plows, double mould-board plows, subsoil plows, harrows, etc. If well done, an excellent tilth is established.

Cultivation should look only to the maintenance of tilth and moisture, and should be practised frequently. The instruments to be used depend largely upon the character of soil used.—*Louisiana Planter*.

PRACTICAL NOTES FOR FARMERS.

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

Since my last notes were written I have travelled about four hundred miles and seen a considerable area of coastal farming country in the south of New South Wales. Now, I saw it under adverse circumstances, the rainfall had been seriously deficient, the crops had mostly failed, and animal life, barring the sheep, was poor and pinched. The whole outlook is for a hard winter for the farmer there. But alas! in all my journeying down there by coach and rail, I scarcely met with a patch of green stuff or any artificial shelter for the cattle. Now, I always stick up for the farmer, for I know exactly how he feels, and the many hardships he endures, and the difficulties with which he has to contend. I know this, that the average farmer working on ordinary lines, has about the roughest, hardest, most laborious and worst paying and most unthankful occupation of any in the country. And especially is this the case of the man with a big herd of scraggy dairy cattle, and a hard winter in front of him. Heaven pity him! he'll have many an anxious hour. And yet, wherever I went I heard men blaming the farmers for want of forethought, perseverance, and enterprise. And as I looked out upon the country destitute of lucerne, or other green stuff; no silos; no shelter for the cattle; no irrigation; no nothing, I felt sorry for everyone all round.

One of the first things I found on my table on my return was a long letter from a practical man resident in one of the choicest dairying districts of Victoria. "I should like to suggest, he writes," a few more articles, showing the value of feeding, attention, housing, etc., in the case of dairy cows—the value in fact of so treating animals as to get the most out of them. Our winters although not excessively cold are inclement and the cattle suffer terribly. Scarcely any are housed or fed, the result naturally being that many die, and the others do not thrive. Many months of the year in fact are lost for the want of food and shelter, in other words for want of attention to the details of the business by which the district lives. If therefore, you can without inconveniencing

yourself, lay stress upon 'intensive dairying' you will be doing us and the district good service."

* * * * *

Now my heart goes out to the writer of that letter, he has hit the nail on the head. It's the same in South Australia, in Victoria, in New South Wales, and in Queensland—in fact all over Australia—the dairy cows are cold and miserable, and fall off in their milk in winter, and the farmer is thrown back and loses money, and with him everyone else suffers, "for want of attention to the details of the business by which the district lives." Now, I have been reading that last bit over to my wife, for she was reared on an Illawarra dairy farm, and knows how things used to be in the past; and the reminiscence is really worth putting into print. She has been telling me of a dairy farm famous for its cattle, where they used to milk on an average seventy cows. The butter from the herd came weekly to from four to five kegs of sixty pounds each, say roughly, an average of three pounds of butter to a cow; a short distance further on, however, lived a man who milked a herd of fifteen or twenty cows, which gave just as much milk as the seventy. Now, the seventy cows were not housed, and only had a bit of hay in winter time; but the man of fifteen cows stabled and fed them, for the whole of his little farm was cultivated, and his animals fed the winter through on green fodder; the dairy, yards, and everything about the place, which closely adjoined the dwelling house, were perfectly sweet and clean. The man and his family prospered, his house was replete with comfort, and he grew wealthy, where other people slaved and grumbled, and barely made a living. This little story I know to be true, but my wife says, that when he commenced to stable his cows, lots of people in the Illawarra district thought him a bit of a fool.

Now, will my good friends the dairy farmers, who read these lines, lend me their ears? Which is the easier to milk, and herd and feed, and look after, seventy cows or fifteen? If you can get equal returns from fifteen cows well fed and well cared for, why keep seventy? But let me put the case stronger, compare the work and feed expense of a herd of seventy big framed cows, and a herd of seven small Jerseys;

and yet seven Jerseys, and by no means pure bred either, thoroughly well looked after, will give an average yield of 200 pounds of butter a week. Thirty pounds of butter a week from a thorough-bred Jersey cow is by no means an extraordinary yield. In the United States one yielded no less than thirty-nine pounds of butter in one single week. But an average of from fifteen to twenty pounds of butter per week may be aimed at by any dairy farmer who knows his business, if he has a small herd of thoroughly kept Jerseys. But the trouble is our farmers cannot take to the idea of small herds. A man who starts dairying with say £300 to spend on his herd, wants to see plenty for his money. Just as the squatter likes to be able to say that he shears sixty or eighty thousand sheep, so the dairy farmer likes to talk of milking from sixty to eighty cows. But it's the ruin of half the men who start dairying. I would sooner sweep chimneys than run a dairy farm with a big herd of scrubbers. If you have got £300 to spend on your herd, put a hundred of it into your bull—and, mark you, take care of him—then give £20 or £30 or £40 a piece for your cows, and feed them, stable them, take care of them, keep them well supplied with green food in winter, make up your mind that every cow in your herd shall average at least fourteen pounds of butter a week, and in ten years time you will have herd of butter producing cows that will be better than a gold mine.

The question is put to me by a correspondent:—"Do you think Ayrshires good breed of cow for butter making?" Certainly they are! and if you cannot go one better, by all means take them. Ayrshire is supposed by many to have originated in a cross between the Jersey and Shorthorn, and certainly possesses many of the characteristics of these two breeds. It is no doubt more hardy than the Jersey, and well cared for is a good milker, and makes a fairly good beast to fatten for the butcher. But I confess to a dislike for any "general purposes" project, whether it's a farm implement or animal. Nothing is constructed so as to be equally successful in two directions; general purposes projects always fail somewhere. Now, to reap the highest success in these

days you must know exactly what you aim at, and then you must go to it by the shortest road. An Ayrshire is only a makeshift at the best. If you want milk only, the Short-horn is your cow. She will give you eight quarts of milk and upwards against the Jersey's six; but if you want butter, either for quality or quantity there is no cow under the broad heavens that can touch the Jersey.

I know that some people will point to big estates and say these people have adopted particular breeds, and that therefore they must be regarded by them as the best. Certainly not! Where owners of large estates supply cattle to tenants, they usually restrict them to very ordinary breeds. Who would entrust valuable dairy cattle, such for instance as the owners of the Coolangatta estate recently imported from Jersey, to the average Australian dairy farmer? The breeds adopted by the owners of big estates are no criterion of special excellence from the fact that the choicest and most money making cattle need the most careful looking after. If other people are going to milk and feed and tend your cows, by all means get a hardy and fairly common breed. But if you have taken off your coat and turned up your sleeves, and mean to make a record in dairying, and a pot of money into the bargain, my advice is to get a thorough-bred Jersey bull if you can, and as nearly thorough-bred Jersey cows as possible, and the more high-bred and delicate they are the better, if you house them, and feed them, and look after them yourself, and clear out boys, dogs, and stock-whips, and all else likely to irritate or annoy them. You see, I don't advise any man who leaves other people to look after his affairs, to go in for expensive cattle,—it would be simple ruination. But I am speaking to men, who, with the help of brains, do their business themselves. And let me say that the most successful dairies in the world from which come the biggest piles of gilt-edged butter are those which have the most women about them.

These big holdings have been the curse and ruin of Australian dairy farming. A big run means wild cows, boys racing about on horses, and no place for the women. What can a woman do on two or three hundred acres unless she can ride about on a horse astride. In Denmark, Sweden,

Brittany, Jersey, and now in America, it's the one cry everywhere. the "holdings must be sub-divided, the cows must be fed and housed, watered, and domesticated, and kept scrupulously clean, and women must milk." Let men run the factories and make the butter, clean the yards down, and drive the carts, but for the best results at the milk pail women must do the milking.

Take Jersey as an illustration, there are forty-five square miles in the island, and for its area it contains more cows than in any other part of the world, besides growing 56,000 tons of potatoes yearly for export, and thousands of pounds worth of fruit. And yet for every 100 acres in the island there are no fewer than fifty-eight cows. All the farms are small, ranging from three to fifty acres. This is the result of old Norman laws, which still hold good there, and prevent the accumulation of property, insisting on its distribution among the various members of a family.

But see how these cows are handled. They are so quiet that it is the common plan to tether them to a cork-screw peg, which is shifted a few yards every few hours during the day, so that not a blade of grass is left uneaten. A lean cow is seldom or never seen, even on the poorest holdings. Dairying in Jersey is a thorough going-money making business, and in addition, at least 300 herd-book stock cows are sold annually—and the cows will sometimes fetch, when sold locally in the island as much as 200 guineas apiece. This is the result of keeping up the quality, and so jealous are they in the matter, and so stringent are the laws which protect their breed of cows, that foreign cattle coming to the island must all be slaughtered within a given time; and their own cattle, once exported, are not on any consideration allowed to return.

The popularity of this breed in the United States is noteworthy. In addition to the pure-bred Jersey cows in the States, there are over 100,000 that are half-bred, and they are growing fast in favor among butter makers, and no wonder, for they will average five times their own weight in milk in a year, and in three years one of them has been known to give 2590 gallons; another yielded 574lbs. 5ozs. of butter in a year, while it is a well-known fact that the body and text-

ure of the butter is better than that of any other breed under equal management.

I urge the value of this breed for people going in for intensive dairying, for the reason that no cow is so docile, so easily managed, so remunerative to the butter maker, or so thoroughly suited for the conditions of our Australian climate. But they must be well cared for.

I am prepared for all that will be said on the other side, and in favor of other breeds. But it is impossible to get away from the inexorable logic of facts. Here, for instance, are the averages for the past few years of the milking trials and butter tests at the Annual Dairy Show in England from picked cows of the various breeds :

Ayrshires—Average weight, lbs., 1062; milk average per day, lbs., $44\frac{3}{4}$; fat average, per cent., 4.43; average total, solids, 13.87.

Cross-breeds—Average weight, lbs., 1342; milk average per day, lbs., 59; fat average, per cent., 3.83; average total, solids, 12.74.

Jerseys—Average weight, lbs., 834; milk average per day, lbs., $28\frac{1}{2}$; fat average, per cent., 5.48; average total, solids, 14.84.

Shorthorns—Average weight, lbs., 1397, milk average per day, lbs., $48\frac{1}{4}$; fat average, per cent., 3.89; average total, solids, 12.89.

Red Polls—Average weight, lbs., 1143; milk average per day, lbs., $33\frac{1}{2}$; fat average, per cent., 3.96; average total, solids, 12.98.

But it is an oft-told tale, and yet most difficult to get folks here to understand. The Jersey takes less feed, and is more easily managed and handled, but gives 5.48 average per cent. of butter fat, and an average of 14.84 of total solids. Besides which, the Jersey is one of the longest milkers between calvings, and gives a rich flow of milk for the greater number of years.

A correspondent wishes to have a question or two answered about butter-making, but I must get through with the subject in hand first, for I have a few more words to say about the Jerseys. I will try next week to satisfy our good friend in regard to cream and butter.

It may surprise some readers to know that the inhabitants of the Channel Island are the most anti-French subjects of the British Crown. Where Jersey cattle really came from is not for certain known, but they could not have well come from France, for the men of Jersey, for centuries, have had no dealings with the French. A Frenchman cannot hold land in the island. The present breed of Jersey cattle is, moreover, at least eight hundred years old.

It is about sixty years ago that the present improved breed of Jersey cattle was originated by most careful selection. In mapping out the scale of points, two cows were taken—one considered most perfect in the fore quarters, and the other in the hind—and from these a committee under the presidency of the Lieutenant-General decided as to how the orthodox hundred points should be allotted. The following is the local description: "A Jersey cow has a small and tapering head, and a small and clean throat. Her muzzle is dark, surrounded by a light colour, her nostrils high and open. Horns small, not thick at the base, crumpled, yellow, and tipped with black. Her ears are small, thin, and a deep orange color within, and her eyes are full and placid. Her neck is straight and fine, her shoulders flat and sloping, and her chest broad and deep. Her barrel is hooped and broad and deep, and well ribbed up, and her back is straight from the withers to the setting of the tail, and broad across the loins. Her hips are wide apart, and fine in the bone, and her tail reaches the hocks and hangs at right angles to her back. Her hide is thin and mellow, covered with fine, soft hair, and yellow in color. Her legs are short, straight and fine, her hoofs small, her arms are full and swelling above the knees, and her hind legs are squarely fixed when viewed from behind, and do not cross or sweep as she walks." Such is the ideal Jersey cow.

I remember some time ago being asked by a correspondent how it is that in English shows all Channel Island cattle are classed as Alderneys (the same held good until quite recently in Australia). The explanation is that Alderney being the last point at which English-bound vessels called, the whole of the Channel Island cattle became known as Alderneys, although the breeds in Alderney, Guernsey and Sark are quite distinct in several features from those of Jersey. The

Guernsey is of a dark yellow, ranging to red, and is less compact in build than the Jersey. The Alderney cattle have more fawn and white in their color, and are more deer-like in their build, and are rather smaller than the Jersey. Sark cattle are claimed by the natives to be a distinct breed, but probably ten people out of a dozen would be unable to distinguish between them and the Jersey. The similarity of the Channel Island cattle, however, points to the same origin, and the probabilities seem to be that they were originally brought from Normandy many centuries ago. Anyhow, farming and dairying pays in these salubrious islands, for the people put more money into the Post office Savings Bank than those of any other part of the Queen's dominions. They are up-to-date farmers, and thoroughly understand the value of artificial manure in raising both fodder and ordinary crops.

In answer to a correspondent, I may say that a good deal of controversy has arisen over the desirability of sorghum as a fodder. In some cases it has proved most disastrous when fed to cattle by thoughtless men, and as much danger is attached to its use as clover. In America, where they put most things right, the plant is largely used, but care is taken to give the animals plenty of other food and water before the sorghum is fed to them.

JERSEYS ARE THE BEST CATTLE.

I need hardly remind practical men that whatever breed of cows they use for dairying, they should run some Jerseys with their herd for the sake of color in the butter. The butter-fat in the milk of Jerseys is in large globules, and the color high, owing to the large secretion of lactochrome in the cells. In regard to crossing, it is certain that the Jersey strain improves any breed for dairying. The Jersey cow is an illustration of the influence of breeding and hereditary training. No animals are kinder or more docile and gentle. No cows yield so large a percentage of butter fats in the milk, and they are far and away the best paying cows for butter-making, where a herd has the oversight of a thoroughly capable man. With a little trouble you may positively teach

them anything, and they will be as easily managed in a yard as a pack of well-trained dogs. But they have never been popular with dairymen in Australia, for, as one said to me recently, "they don't stand sudden changes well; they fall off their milk in cold weather, and they are not hardy."

Now that just opens up a matter which is thoroughly seasonable. The winter is coming on, and to the bulk of farmers cold weather means "tucked up" cattle and a short supply of milk. A wise man has said: "A righteous man regardeth the life of his beast; the tender mercies of the wicked are cruel;" but, as I said before, I don't want to argue from any humanitarian standpoint. The man who, in winter time, finds himself possessed of lean cattle, lean horses and lean milking cows, for the want of comfortable shelter for them, and green food, is a fool to himself. And yet, when one recalls the miserable appearance of half the dairy herds in the country during a cold, wet winter; anatomical specimens of cows, only half-fed, dirty, drenched by every shower and pierced by every winter wind, and all for the want of a little forethought and industry, one is puzzled to know what to say. In these days every merciful man ought to make provision for every dumb animal dependent upon him. And, if he does not, he will be the loser for his inhumanity and neglect. The man who professes to run an up-to-date dairy must provide comfortable shelter for his cows during the winter and plenty of green stuff. It is the only way to make the thing pay, and it will and ought to. And, remember, feed is not enough; no amount of it will prove a substitute for good shelter. But give the cows bodily comfort in the shape of warmth and nutritious food, and there is no reason why both the quantity and quality of the milk should not be kept up all the winter. It means work, of course, but it is the kind of work that pays. This common objection to the Jersey—that the breed is delicate—falls to the ground, for no thorough-going dairyman will allow his cows to be exposed to the severe changes of our Australian winters. Although His Excellency Lord Hampden, speaking at Grafton lately, referred to the advantage of having no winter feed to provide for the cows, it is a mistake most new arrivals fall into. Then, too, there's another matter; the cows which have been

dried off, and the young heifers and calves also want shelter. To turn all these out into a big dry-stock paddock, to rough it the best way they can, is downright foolishness, if you want to make money. A cow heavy with calf needs to be specially cared for; the health of the coming calf, and the ability of the cow to supply it and her owner copiously with milk, depend upon the condition in which she is kept during the period of gestation. While the proper growth of the calves and their general good health depends upon their being kept warm and well nourished during the cold weather, the loss of calves through "bottle" and other complaints, now so common, would be practically unknown if the animals had a little more thought and attention. And, let it always be remembered, that the higher the breeding and the greater the intelligence, the more need for care. You can make as much out of one first class animal as of three scrubbers—but you must take care of her.

Not nearly enough attention is given to windbreaks and other shelter. Some men seem to take a delight in cutting down every tree about a place, and seem to fancy that animals are impervious to rain and cold. But see them with their tails backed up against a fence, and think how they would appreciate a good windbreak of thick set trees to have a nap against on a cold, windy, winter's day. And the shade which they give in summer makes them almost equally valuable then.

(To be continued.)

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NOTES ON SUGAR IN HAWAII, 1896.

BY J. HASTINGS REED, PH. D.

[We have been favored by the General Manager of the Colonial Sugar Refining Company, Limited, Sydney, with permission to publish a valuable report on "Sugar in Hawaii," the contents of which cannot fail to be of the greatest interest to sugar growers and manufacturers in Queensland and elsewhere. For obvious reasons the names of the planters who supplied the information, and of the plantations referred to, have been omitted.]

PRODUCTION.

The sugar cane being indigenous to the Hawaiian Islands, the sugar industry was soon started after the arrival of the first white settlers, and, from a very humble beginning, the business has grown to be of considerable magnitude, being now the commercial mainstay of the country. Last year (1895) the total production amounted to 150,000 short tons, of about 92 n.t. The season was somewhat adverse, and the prices realized were the lowest ever obtained in Hawaii. This year (1896) is full of promise, as crops are turning out very well and higher prices are ruling. It is estimated that the output will reach fully 180,000 short tons. Practically the whole of the production is shipped to San Francisco by steamer or sailing vessel, but any surplus above "coast" requirements has to be sent to New York via Cape Horn. Hawaii's only market, at present, is the United States, but it is expected that in the future some shipments may be made to Canada. Business is done entirely with the Sugar Trust, and the standard of quality on which sugar is bought is that of 96 per cent. polarization. The price paid is the same as Cuban 96 per cent. sugar commands in the New York market less $\frac{1}{4}$ cent per pound. For each degree of polarization above 96 per cent. then 1.32 of a cent extra is allowed, which is simply a proportionate value per degree when sugar is 3 cents per pound. Should sugar be 4 cents per pound or even higher, then this increase per degree of 1.32 of a cent is not the proportionate value. Sugar below 96 per cent. polarization has the deduction of $\frac{1}{4}$ of a cent per pound down to 92 per cent. polarization, after which still greater deductions are made. It is clearly to the interest of Hawaiian planters to turn out only sugar of as near 96 per cent. polarization as possible, for at this strength they get the highest value per unit of crystallizable sugar.

Sugar shipped to San Francisco (which may perhaps be delivered at refineries within three or four weeks of manufacture) are paid for on San Francisco polarizations and weights. Deterioration, or fermentation as it is called in Hawaii, has only recently been recognized there—since a beginning has been made with chemical control. It is stated

that the loss by deterioration shows itself more in the lower grade sugars, which, I think, is contrary to the company's experience, and an opinion prevails that the remelting of low grade sugars in the juice is a cause of deterioration in the sugars produced. We, however, know that deterioration takes place in our strongest mill sugars even when there has been no remelting done at all. Another suggested cause for deterioration is the use of wooden gutters for juice and syrups, which is a common practice in Hawaii, but this we also know is not the cause. Both practices may, however, contribute to some extent to the trouble. It seems to be generally conceded that the lactic and butyric acid fermentations and perhaps others of a more complicated character are the cause of deterioration.

The production of sugar in Hawaii is spoken of in terms of short tons marketable sugar per acre. This is somewhat indefinite, as it does not take into account the quality of the cane or the character of the crushing and mill work. Though perhaps the yields of sugar per acre, according to reports which have reached us in the past, may have been exaggerated, I am inclined to think that the actual yields are greater than has been given out from supposed authentic sources of late. There is a feeling in the United States at present that, with the high yields of the islands and cheap Asiatic labor, the Hawaiian planters have great advantages over the Louisiana planters, and it is probable attempts will be made to deprive the islands of the benefits now partly enjoyed with reciprocity treaty. Under these circumstances there may be a tendency to under estimate the yields in order to strengthen the islands' position in case United States legislation of an adverse character should be threatened. For 1894 and 1895 the yields are recorded as below :

1894, 2.4 short tons per acre ; 1895, 3.2 short tons per acre ; 1896, 3.4 short tons per acre.

Individual planters consider these figures much too low.

LABOR.

The labor employed is principally Japanese, Chinese, Portuguese, and Hawaiian. Portuguese and Hawaiians are preferred as plowmen, teamsters and for general odd jobs, while

the Japanese and Chinese form the bulk of the field and mill labor. All classes of labor are considered satisfactory, though managers vary in their preferences.

The Japanese perhaps are or were considered somewhat troublesome on account of the pretexts on which they refuse to work. This disposition appears to have been fostered by the subordinate inspectors (Japanese) at that time employed and who were evidently anxious to appear active in the interests of their countrymen. Since the recall of these inspectors some time ago there has scarcely been an instance of trouble. The principal Japanese inspector now in Honolulu will not listen to petty complaints, and he encourages the "cutting" of wages by the employers rather than they should resort to the usual Court procedure in cases of neglect of work, laziness, etc. Magistrates, though just, do not pamper the laborers, nor do they handicap the planter in the maintenance of strict discipline.

On first introducing the Japanese laborers the beriberi (which created such mortality among the Japanese in Fiji) became alarmingly prevalent. This was quickly stamped out by the authorities, who insisted on the laborers eating principally fresh foods, curtailing the use of rice and forbidding the consumption of the dried fish, fruits, and various messes imported from Japan on which they had previously subsisted. This action was accompanied by the medicinal use of strychnine, and the epidemic soon disappeared. Individual attacks of beriberi are now rare and only occur among new arrivals.

As plantation laborers the Japanese largely predominate, and of late, for political reasons, there has been a tendency to import large numbers of Chinese and Portuguese. The Chinese are forthcoming in plenty, but the Portuguese do not now come so readily as in former years. A few shipments of northern Europeans some years ago turned out very unsatisfactorily, and this experiment is not likely to be repeated, so it would appear that Hawaii's labor supply will in the future be drawn largely from China. Managers much prefer mixed labor as a preventive of combinations and mutinies and a safeguard in case of trouble,

The following is an abstract of the terms of contract of

one of the Chinese labor immigration societies which brings laborers from or through Hongkong :

Term of service, three years ; hours of work, ten hours per day ; wages, \$12.50 per month (U. S. gold) ; cost of introduction, \$50 ; finding, houses, wood, water, medical attendance, taxes ; age of laborers, between 21 and 40 years ; condition, physically fit.

In case of laborers deserting, the society refunds to the planter \$1.39 for each month of unfulfilled service.

The Chinese are said to be good steady workers, and are not given to shamming sickness or staying away from work. The rate of wages and other charges as above given are about the same for Japanese contract labor. Portuguese and Hawaiians usually command higher pay, the former frequently obtaining up to \$16 per month for field work and up to \$20 for special employment. Hawaiians, who are good laborers at jobs they like such as handling stock, plowing, or boat and wharf work, generally get the highest wages, viz., \$20 per month. Broadly speaking laborers' pay varies from from \$12 to \$20 per month.

At some plantations the "company" system has been in successful operation for some two or three years. On Ewa, gangs of laborers undertake the cultivation of land after planting at the rate of seven acres per man. They water, weed, manure (provided), cut and load, receiving as their remuneration \$1 per short ton of cane, the crop requiring about eighteen months to mature.

The system in which labor is managed struck me as being one good reason for the excellent character of the field work done on most of the plantations. There is an absence, too, of handicapping labor ordinances which must facilitate the handling of laborers. Under the manager who superintends matters generally, is the overseer or head luna who is responsible for all plantation work from start to finish, including management of stock and implements.

The overseer has under him, in turn, the ordinary lunas, who have gangs of from thirty to fifty laborers each and whose sole duty is to stay out in the field all day constantly examining the work done by their gangs and keeping all up to the desired standard. On the irrigation plantations the

number of laborers to the luna rarely exceed thirty, as the work needs more careful supervision—particularly in the prevention of waste of water—while in the rainfall districts about fifty laborers per luna is customary. The hours of labor are ten per day in the field according to contract, but it is customary to be a little easier. Task work is very rarely practiced. Previously, I understand, the system of having lunas of the same nationality as the laborers was common, but this was found to be unsatisfactory, and, after a thorough trial, was abandoned. The lunas of today are principally Europeans, their work is field work only, and they finish with the labor. The overseer (in conjunction with the accountant) keeps all records and returns relative to cultivation. He is usually a thoroughly practical and well-informed agriculturist, possessing considerable local experience, and managers are frequently drawn from men of that rank.—*Macky Sugar Journal*.

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HOW TO MAKE FARMING PAY.

(FROM THE AUSTRALASIAN.)

COMBINING PLEASURE WITH PROFIT.

Farming is not, as a rule, engaged in by the producers of this or any other country merely for the pleasure it affords, or the healthful life it brings, but for the profit that is to be made at the business. It is only in very rare instances that one finds anyone farming for amusement solely, or even for the good of his health. The great bulk of the tillers of the soil are seeking for wealth, or at least a living and a competency as the reward for their labor. If the living can be made, the average farmer is very liable to become satisfied and less progressive in his ideas about things in general. He falls into a groove or habit of doing so much work, expecting to get a certain return. It is this class of farmers who are constantly getting into debt; they have no reserve fund either in cash or energy. Consequently, when there is a general collapse in the price of produce or failure of the crops, the easy-going farmer is in a dilemma at once, and his farm goes from bad to worse. The want of resource and foresight in an emergency is a sad failing in the character of any man,

but particularly in that of the farmer, who has to plan and scheme far in advance so as to avert coming disasters. It is true that "the best laid schemes gang aft alee," but with a little forethought it is truly surprising how much loss and trouble can be avoided on a farm during the space of one year. There are a thousand and one ways in which foresight can be applied; in fact, there is scarcely a single operation or a move of any kind made but what forethought is necessary in carrying it out. More than this, the farmer who looks ahead of things sees where a leak or breakage is pending, and by putting in "the stitch in time saves nine." This old proverb is as true today as ever it was, and no farmer can afford to neglect its teaching.

ORDER AND SYSTEM.

No farmer can make a profit who lacks order and system in his management. Imagine a place that is lacking in these two requisites, and you will find that the owner is invariably a poor man. There is nothing on such a farm that is striking or distinct; it lacks care and tidiness in every department; the whole concern is in disorder. Tools and implements are lying scattered about and going to waste in every conceivable manner. Gates and fences are falling down for want of a very trifling repair. Sacks and bags are rotting on the ground instead of being carefully hung up in a dry shed. The buildings, such as they are, are inadequate in size and number for the purpose they are intended to serve; they appear as if they had been put up in a hurry and without the least regard to architectural skill and arrangement. The buildings, such as they are, are inadequate in size and number for the purpose they are intended to serve; they appear as if they had been put up in a hurry and without the least regard to architectural skill and arrangement. The whole premises have a tumble-down aspect, showing the owner to be devoid of all order or system in his methods of working. These are some of the features of a badly-managed farm, and wherever they are found, depend upon it, there is little pleasure and less profit obtained from that holding. In these times, farmers cannot afford to despise order and system in any detail of their business. Implements and machines of

every kind should be carefully stowed away in a place provided for them, especially when not in use, and not left to rust and decay in the corner of the fence with the sky for a cover. Farmers who are in the habit of taking care of their tools and machinery never find it any extra trouble to put things in their proper place when finished with at the end of the season. Indeed, a great saving is effected in knowing where to find them again, as well as in the better condition of the implements that have been sheltered from the wet and the sun. So long as order and system are wanting in regard to the small things about a farm, it is needless to expect any different kind of management with regard to the larger items.

LEAKS AND LOSSES.

Every little leak on the farm that can be stopped should receive the same prompt attention as if it were a matter of the greatest importance. In his daily rounds the farmer sees, perhaps, a broken rail in the fence. If he is of a careless disposition he will pass it by, making a resolve to bring a hammer and nails to fix it up in a day or two hence; he has not time at present to attend to it. The next time he comes along he finds there are two rails down, but he again reflects that the stock cannot yet get through, and so he still procrastinates about getting the hammer and nails required to repair the fence. On his third visit the careless farmer finds that a whole panel of the fence is down, and that the stock are in the crop doing irreparable damage perhaps. Then he calls out his men and his dogs to clear out the marauders, which takes them about half a day, doing the stock a lot of harm, while the afternoon is spent by a teamster in hauling new rails and other material to fix up a rent in the fence that would have been mended in five minutes by a careful farmer when first noticed by simply driving a few nails into the broken rail. It is this sort of leaks that brings many farmers to the door of bankruptcy. They put off from day to day doing things that are urgent and the leaks meanwhile grow bigger and bigger until the expense of repairing them becomes a very serious matter. To make farming pay,

therefore, prompt attention to leaks of every description is of very vital importance.

“For want of a nail the shoe was lost ;
For want of a shoe the horse was lost ”

GOOD AND BAD WORKMANSHIP.

There is a great difference in the quality of some farmers' work compared with that of others. This is true of all trades and professions, but it is less desirable and probably less excusable in farming than in any other calling. Agricultural machinery is now wonderfully perfect, so much so, in fact, that a clever mechanic can beat the most experienced farmer in running the more complicated machines employed in the harvesting of wheat, for instance. The same is true as regards plowing. The modern plow is not made to convenience only those who have spent years of probation between the “stilts.” It is now constructed in such a way as to run itself, so that the veriest tyro at plowing can go ahead, providing his irons are properly “set” to start with. The ingenuity of the plowmaker has rendered the holding of the plow a matter of mechanical skill rather than of muscular strength as in the days of old. But for all that the new-fashioned plow has not brought with it any great improvement in the quality of the work done. If anything, it is rather worse, not because the plows are deficient, but because those who drive them are in too great a hurry to get over the ground. The old plowman was obliged to take time, and his work was generally well executed. The new plow on wheels can be driven at a much greater speed, and set to such a depth as merely to scratch over the surface. This improvement is useful in its way, but has also much to answer for in inducing farmers to cover more ground than they can properly cultivate. Imperfect, slipshod plowing is, no doubt, responsible for a great deal of the inferior crops that are grown, and every practical farmer knows that where the yields are light the weeds are sure to increase in proportion. These usurpers, in turn, lead to further trouble, and so on it goes, until the land is exhausted from the treatment it has received, which commenced by being badly plowed. It is important, therefore, to see that all tillage operations are

performed in due season and in the best style of workmanship. Nothing else will do if a profitable crop is to be grown, and the farmer who attempts to do more than he is able to do well and thoroughly under the circumstances at his command had better leave the job alone, or it will only land him in disappointment. It is not alone in plowing or other tillage operations that the mistake is made of doing things in a hurry and imperfectly. The complaint of bad workmanship is generally noticeable in every other department of the farm where it happens once, and the rule should be observed of never doing any work that is open to criticism, or of being found fault with in the farmer's own conscience. It is so much more pleasant, not to speak of the profit it brings, to look back upon a piece of good workmanship than on a shoddy performance.

FEWER AND BETTER STOCK.

One of the chief drawbacks to profitable farming in this country is the inferior quality of the stock that are maintained on many of the holdings. It passes comprehension to understand what the object can be in keeping such a lot of useless brutes as are to be seen on many of the farms. They are not there, certainly, to my view, for the purpose of making a profit to their owner. They are rather, it would seem, maintained for the purpose of eating up all the grass just because it grows there and might take fire some day on its own account. It would really be better and more profitable to fire the grass than eat it down with a lot of miserable runts. There is no money to be made from that class of stock, and no farmer should have them about his place. It costs just about the same to maintain a good cow, a sheep, or a horse as it does to keep a bad one of either breed; but, when the owner comes to sell the produce of any of them, he finds that it is only those animals which are well bred and of good heart that leave any profit. Mongrel cattle, sheep or pigs are very poor property in any man's hands, and they are simply ruinous to the farmer who is looking for even a small return from any of them. The farm can never be made to pay so long as it is encumbered by rubbishy stock. One good cow is preferable to a dozen bad ones; so is one good sheep

or one good horse. Why on earth so many farmers persist in keeping a number of useless animals about them I could never explain? But it is a fact, all the same, that many of them have a big collection of lame and halt sheep, scraggy cattle and weedy horses on their premises, the use of which is simply the waste of good food and attention that should be turned to better account on better animals. A profit is not possible, and need not be looked for, when the farm live stock is of the nondescript character. It is hard to convince some people that their stock is not so well bred or as profitable as it might be; yet the hard fact of experience, to a willing mind, is a grand teacher. Let anyone who has any doubt on the subject just, by way of experiment, put a good cow into the place of two bad ones for a week, substitute ten good sheep for a score of lame ones for a time, or put up to fatten two well-bred pigs against four of the razor-back type and he will soon see the advantage of keeping fewer and a better quality of stock on the farm.

PLEASURE AND PROFIT.

Unless a profit can be made, there is not much pleasure in farming, any more than there is in going on a holiday without a well-filled purse in your pocket. It is, however, an occupation in which all classes may engage, providing they have the wherewithal to make a start. Though farming has many advantages over city trades and professions in the way of healthful enjoyments that do not pertain to the town, it is, nevertheless, a fickle business, and far more uncertain than the inexperienced would, perhaps, imagine. There is just about the same difference in the skill of farmers as in any other profession. Visit a community where nature has bestowed upon all farms equal fertility, where rain and sunshine treat all alike; where all are industrious. Some of these farmers are gaining in wealth while others are hardly making a living. Why is it we see the difference? It is because some farmers have a better faculty for planning and managing their farms, exercise forethought, have everything in order, and manage on a well-defined system; do all their work in thorough good style, and keep nothing but first-class stock of whatever breeds they maintain. These are the men

who make a success of farming, and they never fail so long as they live moderately. The farmer cannot indulge in expensive luxuries of any kind, but he can still have every comfort and enjoyment in moderation. And while no one can lead a happier and healthier life than the farmer, he has still to be a man of sterling worth both in character and ability to hold his own. Hard work and long hours, often under a broiling sun, are some of the consequences of his avocation, but a farmer can take his ease at certain seasons as comfortably as any other individual in this world. On the average, during the year he need not rise earlier than the 10 o'clock banker, or work later than the 4 o'clock civil servant. Brains count for more than muscle now-a-days at farming, and the man who lies in bed till 8 o'clock and plans out clearly the work of the day often gets ahead of his neighbor who gets up early and in a hurry without any definite idea what the duties of the day ought to be.—*Australasian*.

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AN OSTRICH FARM IN FLORIDA.

Major Tiffin's home, "Rose Lawn," is located on Merritt Island, about midway down its length of forty miles, and here he has established himself most comfortably in a house of the bungalow style, except that the main portion is of two stories. The grounds are extensive, with grassy lawns, an orange grove and ornamental trees. A pretty flower garden surrounds the house with great beds of primroses, and clustering vines form arbors over rustic seats. One of the chief ornaments of the door yard is a well-grown camphor tree, from which the Major expects to obtain camphor gum. He is much pleased with the growth of this tree, and, judging from its apparent adaptability to this locality, he thinks an extensive grove might thrive here. He is also cultivating on an experimental scale Havana and Sumatra tobacco, the plants of which look well and thrifty. The vegetable garden and citrus trees have been prolific, and a fine crop of sweet potatoes is now on.

Leading from the Indian river, eastward to the residence, is a beautiful avenue of bamboo trees, tall and graceful, that have attained a remarkable growth. The gates, fancy wicker-

work, and fences, ornamental bridge railing and porch balusters, are all made of the bamboo. Much of the light furniture in a new hotel south of his home, which he is having built, is also made of the bamboo by a native Japanese employed on his place.

The Major purchased in Atlanta last fall fifteen ostriches, seven females and eight males, and moved them to his home. The ostriches became acclimated with no trouble, and are as happy and thrifty a colony of immigrants as one could wish to see. Two of the birds are African, the others were raised on a farm in Southern California.

Since last spring the hens have been laying. He has forty eggs hatching; the others are in three separate nests set on by the birds—the female during the day and the male during the night. Forty-two days are required to hatch an ostrich egg. These were set May 16th. The incubator used is a chicken incubator, adapted to ostrich eggs. It is heated by a kerosene lamp with thermometer attachment. An electric ball contrivance warns persons in the house, some distance away, when the heat rises above a given degree, so that it might be regulated at once. A temperature of 110 degrees will kill the eggs. The packing around the eggs in the incubator is “mineral wool” made from a mixture of slag and other rocks, forming vitreous substance, converted to a fibrous condition. In appearance it consists of a mass of very fine fibers intertwisting each other in every direction, forming an innumerable number of tiny air cells.

Each pair of birds has a half-acre run, with plenty dry sand, gravel and grain food. A hose also supplies a little pool in each run and stall with cool fresh water. The gravel was secured for the birds from Atlanta. The house is the Major's own idea, and a unique and practically arranged structure it proves to be. A round house, sixty feet in diameter, has been built in the center of the ten-acre inclosure. Radiating from the center of this round house are sixteen stalls, extending to the limit of the inclosure, giving each bird a room to itself, the sixteenth stall extending into the house-yard and serving for an avenue into the ostrich domain. In the very center of the house, under a large, central draft shaft, is a circular chamber, with doors opening

into each stall, thus affording a means of transference from one stall to another without going outside of the inclosure, and through which the ostriches may be changed at will.

A three-foot opening extends around the walls near the eaves. A similar opening is left in the cupola, and these openings will be screened with fine netting. The house-entrance to each stall is closed by a heavy door, thus shutting up the ostriches at night, and keeping them from mosquitoes. The Major's idea is to let them run during the day and confine them at night; the hens are setting in the house, the eggs being laid in the loose sand, and the nest is simply a hole scooped out.

An ostrich begins laying when she is five years old, laying fifty eggs, weighing thirty-two ounces each, a year. These eggs sell for \$20 apiece. The profit from the bird begins earlier than laying time, however, as the feathers are marketable early, and the manure is an excellent fertilizer. Mr. Tiffin says that he will never have to buy any more fertilizer for his orange grove or garden so long as he keeps his ostriches. He has already gathered a large box—several hundred, perhaps—of feathers of good quality, but has not yet begun regular plucking. The bird has to be tied when the plucking goes on, the feathers being removed with pinchers to avoid tearing the flesh. If such an accident happens, the aperture is never replaced with a feather. The birds are well grown and healthy, the body standing about five feet, the great neck makes the bird about eight feet tall.

Major Tiffin is very much encouraged with his beginning, and does not hesitate to say that he expects to succeed. When the young chicks shall have been hatched he will build a separate lot for them, enlarging his premises as he has need. His library contains several popular works on ostrich farming, the best among them, in his opinion, being "Home Life on an Ostrich Farm" by Annie Martin, who is an American authority; and "Ostrich Farming in South Africa" by Arthur Douglass, who has had extensive experience in Africa. These books contain most of what is worth knowing about ostrich farming, and he studies them assiduously.

Major Tiffin is looking forward to training one or two of his great male birds to draw his cart. They are frequently

put to such use in Africa, and latterly in California. They are very strong and sometimes vicious, but a careful trainer knows how to handle them, and they become, in time, much attached to their keeper.

The success of the Rose Lawn ostrich farm on Indian river is now a settled fact. Another Florida industry is being firmly established. A glance at the healthy birds, the well-arranged house and grounds, unique incubator, abundant eggs, new handsome feathers, and thrifty growing grass made green and luxuriant with ostrich fertilizer, finds in these undisputable evidence of present excellent condition and a guarantee for future profit.—*Cor. Jacksonville (Florida), Citizen.*

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COFFEE-PLANTING AT MACKAY.

Among recent arrivals in Queensland is Mr. John Dansey, an old Ceylon planter, who was forced to abandon coffee-growing in that island owing to the heavy losses inflicted by the leaf disease. He has also been in most of the other coffee-growing countries in the world—the East Indies, India, and Brazil, for instance—and comes to this colony with a full acquaintance with the different methods of cultivation and treatment. Mr. Dansey passed through Brisbane lately with the intention of going as far north as Cairns, “prospecting” for coffee land. On arrival at Mackay, however, he found himself in the heart of the finest coffee-growing district he had ever seen, and had no wish to go any farther. He was perfectly astounded at the wild profusion in which coffee trees grow and produce their fruit on the few plantations in the district which include coffee among their crops, and exhibits as specimens of marvellous prolificness two or three branchlets heavily laden with ripe cherries. He is deeply impressed with the capabilities of the northern coast lands. Nothing could be more conducive to favorable coffee crops than the heavy dews and fogs which he saw while in Mackay, and the absence of frosts was an additional feature which would help the industry to a favorable extent. In answer to a question whether he was satisfied with the prospects of coffee in Queensland, Mr. Dansey be-

came quite enthusiastic. Pointing to his cherry laden sprigs, he expressed wonder that the drought and frost to which the trees had been subjected had had no appreciable effect. If our farmers only knew the value of coffee, he declared, they would soon grow it extensively. Since the abolition of slavery in Brazil the world's crop of coffee has been short, and merchants are eagerly seeking for new sources of supply in order to keep pace with the demand. He believes that for the next forty years there will not be a safer crop for Queensland planters, and that farmers who at present grow only cane should in addition plant coffee, and thus have two strings to their bow. He is convinced that coffee is far before cane as a profitable crop. The cost of preparation and planting is not so heavy to begin with; the labor of harvesting is also much lighter, and the crop ripening in the cool months there should be no difficulty in securing the necessary hands at the right time. Mr. Dansey tells of a plantation near Mackay where the owner has grown coffee for years with very little attention, and has made a good living by roasting the berries and selling it in the neighborhood. From one tree on this estate he saw a man pick a four-bushel bag of cherries and regards that as remarkable evidence of fertility of soil and suitableness of climate. Mr. Dansey intends to settle down in Mackay where he has under offer a large area of virgin land eminently fitted for coffee. He will not confine his attention to the one crop, but will probably try cocoa cardamoms, and other tropical products in order not to have all his eggs in one basket, as he expressed it. He has come to Brisbane to find two or three others who are willing to add their capital to his and take a practical interest in the industry, and with the view he is advertising for partners in his enterprise. He returns to Mackay in a few days in order to get things under way for the planting season, which is rapidly approaching.—*Brisbane Courier*.

Once every fifteen years the planet Mars comes within 35,000,000 miles of the earth. At all times a distance of something like 141,000,000 miles separates the Marsians from the people of our sphere.