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The latest quotation of sugar in New York was $3\frac{3}{4}$ cents for Cuban centifugals testing 96 deg.

The suggestion made in an article on coffee, on another page, of planting bananas between young coffee trees, is well worth the attention of coffee growers.

A new coffee hulling machine was imported from England in the bark Ladstock by Mr. May, for Mr. George Macdougal's coffee plantation in North Kona, Hawaii. It was shipped to its destination on the steamer Mikahala.

Lemon growers of New South Wales propose to supply the San Francisco market with lemons in the Colony, which are said to be very superior in quality. The shipments may prove like coals sent to Newcastle.

The first license for the coming season, during the year commencing July 1, 1893, was issued recently to the Chino Valley Beet Sugar Company, which estimates its production will be 18,000,000 pounds of sugar from its 6000 acres of beets.

The May number of the New South Wales Agricultural Gazette contains an exhaustive report on insect ravages in the sugar cane crops of Australia, by A. Sidney Olliff, government entomologist of New South Wales. It is illustrated with plates.

According to Professor Wiley, chemist of the United States Department of Agriculture, California produced 20,000,000 pounds of sugar last year more than any other State, so that in case of a suspension of the bounty on sugar Californians would probably be the greatest sufferers.

The experiment made lately of sending fresh fruit from Australia to the Chicago exposition in cold storage steamships via London and New York has proved a failure. Some of the apples reached Chicago in good condition but the pears, grapes and all other fruits sent were not worth exhibiting.

The entomological department of the State Board of Horticulture has received from Charles D. Miller, a coffee planter of North Kona, Hawaii, in the Sandwich Islands, specimens of a scale that is proving very destructive to the coffee plants on the islands. It is similar to the cottony cushion scale. So says an exchange.

The suggestion which has been made in one or more American papers, that all bank note currency of less than ten dollars in value should be withdrawn from circulation in order to allow an increase of silver circulation is a sound one, and ought to be advocated by silver men, and carried out by congressional action. It would create a demand for from fifty to seventy-five million dollars more silver than is now used.

A glance at the late Hawaiian census shows that in everything but Government the Islands are already a part of the United States. Of their trade $18,332,631.80 or 91,18 per cent., is with the United States; $1,104,022.12, or 5.49 per cent., with Great Britain; and $668,376.79, or 3.33 per cent,, with other countries. The total value of the Hawaiian sugar plantations is $33,347,690, of which $24,735,610, or 74.17 per cent., are owned by Americans; $6,038,130, or 18.11 per cent. by Englishmen, and $2,757,910 or 7.72 per cent., by people of other nationalities.—*Exchange.*

In Berlin no animal may be killed, under a heavy penalty, except at the municipal slaughterhouses. Here every animal is not only subjected to a close scientific examination, but specimens of its blood and tissues are examined under powerful microscopes, forty-five lady microscopists, with eyes trained to the work, being constantly employed. Of course even the microscope may fail to reveal anything, and it would be impossible to submit all meat before consumption to bacteriological cultivation. But the microscope is a test which in ninety-nine cases out of a hundred will give some indication if unsoundness exists. The cost of this scientific work in the German capital, it may be well to state, is not a charge upon the rates, but is part of the working expenses, which are more than covered by the revenue derived from butchers and others using the public establishments.

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THE HAWAIIAN POSTAL SAVINGS BANK.

We note with pleasure the improvement in the condition of the Postal Savings Bank, which has branches in every village of the group. For the past two years there has been, among a portion of the people who use it as a depository for the safe-keeping of their earnings, a want of confidence in it, which has led many of them to withdraw their deposits. Probably most of these had no immediate use for their money, but were induced to give notice of withdrawals from a fear that something might happen which would result in loss. Happily the change of government, and the marked improvement in the conduct of public affairs, is restoring confidence in the bank, and deposits will in consequence increase.

Our Savings Bank system, which was patterned after those of Great Britain and New Zealand, is a most admirable one in many respects, but is defective in one particular—the investment of the deposits, so that they may be available at any time to meet the demands of depositors. At present all the deposits are turned over to the Government treasury, and treated as borrowed money, for which bonds are issued payable to the Postmaster-General; in other words, the savings bank deposits are treated as a national debt, for which the government becomes responsible, the same as for any borrowed money.

In prosperous times, when the government treasury has a considerable surplus on hand to meet the ordinary wants of those who wish to draw out their balances from the bank, everything works smoothly. It is only in panicky times when a feeling of insecurity pervades the community and money becomes scarce, and the treasury funds run low, that the defects of our postal bank system become apparent. The bank is supposed by most of its depositors to be able to repay them their money as agreed, at the end of the required notice, even to the extent of the whole amount on deposit. The withdrawals in ordinary years seldom exceed five or six thousand dollars a month, which are expected and readily met; but suddenly the demands increase to twenty, forty or fifty thousands a month, for which no provision has been made, and if the treasury surplus is exhausted, the result is that the postmaster, the finance minister and the depositors are all seized with trepidation. To meet such emergencies the postal bank has not been provided.

When the bill authorizing the establishment of a postal bank was under discussion in the Legislature nine years ago, attention was called to this very point—the necessity of having a portion of the funds invested in securities that might be available whenever wanted, and the suggestion was made by the writer, then postmaster-general, that they might be invested in some other than Hawaiian bonds—perhaps United States bonds, or California, State, city or bank bonds. But the reply was that no occasion would ever arise when the government treasury could not meet all the demands that would be made, and there was no necessity for investing the funds abroad.

Late experience has shown that times will come when the bank is called on to pay out in a short period half a million dollars more than its receipts. Fortunately the demands have all been met with no serious consequences. But the same experience should teach us to guard against its return, and that a portion of the deposits should be invested in securities more available as cash than the treasury bonds now issued to the postmaster-general. This can be done by authorizing the investment of a part of the deposits—perhaps one half—in California State or other equally safe bonds, drawing six per cent. interest, which can always be disposed of there or here without loss to the bank, within thirty or sixty days. These securities should be kept in the treasury vaults and could always be saleable for cash as remittances.

In correspondence some years ago with the director of the postal savings bank of Demerara, British Guiana, which is very similar in all its features to our postal bank, we learned that the bulk of their deposits was invested in foreign securities, and none was turned into the Colonial treasury, as a debt due to the postal bank as is done here. And this plan was highly approved as affording the safest and best security.

The experience of the past two years warns us that if we wish the postal bank to possess the fullest confidence of the public as a safe depository of the people's money, there must be a change in our present system of funding the deposits or at least a part of them, so as to be available as cash whenever wanted. It would tend to strengthen public confidence in the institution. A savings bank is an extremely sensitive index of the popular pulse, and no efforts should be spared to maintain its reputation above suspicion.

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AGRICULTURAL EXPERIMENT STATIONS.

Our readers are probably aware that the United States Government and many of the State Governments maintain what are called "Agricultural Experiment Stations," for the purpose of ascertaining the relation of plants to the soil, the constituents of both soil and plants, and what constituents are needed to place both in perfect harmony, and thus develope the most perfect growth of every useful product of the soil. Each station is under the charge of a director, who is assisted with from ten to fifteen experts in chemistry, horticulture and any other branches of science necessary to impart a perfect knowledge of what the Experiment Station is designed to ascertain.

We receive pamphlets from seven or eight of the stations, some of which contain information of value to farmers and planters on these islands. But generally their reports refer to the products of the temperate zone, while our soils can only be analyzed by being sent abroad for this purpose. On the staff of officers employed at the New York State Agricultural Station, at Geneva, is Prof. L. L. Van Slyke, Ph. D., whom many of our readers will remember as a chemist of the Oahu College at Punahou, near this city, several years since. Prof. Van Slyke has taken a high stand as an expert in agricultural chemistry, and his reports are conspicuous for the simplicity of style and clearness of description, which enable any person to understand what he describes, to become interested in them, and to profit by his instruction. It is the dissemination of such useful knowledge that is leading to better results in every branch of agriculture. in Germany, France and other European countries, and we may hope the same of the United States, which has more recently entered into this service.

In his latest report, refered to in our last issue, on "the composition and use of fertilizers," the professor starts out with the following prelude:

"Until fifty years ago, agriculture was without a scientific working basis. To the investigations of the illustrious German chemist, Justus von Liebig, we largely owe the advances that have been made in agricultural methods during the last half century. The following four laws, which form the foundation of modern agricultural practice, were fully established by Liebig:

"1. A soil can be termed fertile only when it contains all the materials requisite for the nutrition of plants, in the required quantity, and in the proper form.

2. With every crop, a portion of these ingredients is removed. A part of this portion is again added from the inexhaustible store of the atmosphere; another part, however, is lost forever if not replaced by man."

3. The fertility of the soil remains unchanged, if all the ingredients of a crop are given back to the land. Such a restitution is effected by manure.

4. The manure produced in the course of husbandry is not sufficient to maintain permanently the fertility of a farm; it lacks the constituents which are annually exported in the shape of grain, hay, milk and live stock."

These four laws of Liebig contain a clear statement of the principles underlying the use of fertilizers; but, to understand their meaning with satisfactory clearness, we must know something more in detail about the following subjects:

The constituents and food materials of plants.

The constituents of soils.

The relations of soils and plants.

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

He then elucidates each topic under various heads, so clearly that any one can understand what is said. The report covers about ninety pages—too long of course to allow of extended extracts. In the section on the "Constituents of Soil," he beautifully illustrates how soil supplies food of various kinds, and how the soil serves or a mechanical support to plants and an indirect fertilizer.

Regarding the value of various fertilizers, he favors high-grade as the most economical. We quote his reasons:

"In applying fertilizers, bulk is often desirable, but in purchasing commercial fertilizers, the object should be to secure as much nitrogen, potash and phosphoric acid in available forms as possible for one dollar, instead of as many pounds as possible of fertilizer, regardless of the amount of plant food contained in it. This is particularly applicable to mixed fertilizers, which at present form the great bulk of fertilizers sold in this State. Since there is smaller bulk to handle in mixing, a smaller number of packages for holding, and, consequently. less weight and freight, it is, as a rule, more economical to purchase fertilizers in their more concentrated forms. For illustration, it is more economical to purchase one ton of a high grade fertilizer at $45 than three tons of a low grade fertilizer at $15, one ton of the former containing the same amount of plant food contained in three tons of the latter; because, in making the latter, three times as much labor is involved in mixing the goods, three times as many packages are required and three times as much freight must be paid, all for the same amount of plant food."

We should like to copy the report in full, but our limited space precludes this. A note at the bottom of page 270 states that the pamphlet will be sent to any farmer on application, and those wishing to obtain it can do so in the way indicated.

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DOMESTIC EXPORTS OF THE HAWAIIAN ISLANDS FOR THE FIRST SIX MONTHS, 1893, COMPARED WITH THE CORRESPONDING PERIOD, 1892.

The tables prepared by the Collecter General show a handsome increase both in quantity and value of the various exports from these islands for the first half of the current year. The nominal increase is $1,555,926.96, but the real sum is much larger, exceeding probably two millions for the period named, (six months) as the entire rise in the price of sugar is not counted in the customs valuation.

ARTICLES.	1893.	1892.	Increase in Quantity	Decrease in Quantity.	Increase in Value.	Decrease in Value.
Sugar, pounds..........	238,975,111	212 744,667	26,230,444	....	$1,5[illegible]7,416.87	....
Rice, pounds..........	2,825,895	4,017,295	....	1,191,400	....	73,514.87
Hides, pieces..........	9,875	12 307	....	2,432	....	5,030.65
Bananas, bunches.....	58,[illegible]9	44,751	14,168	....	14,048 00	....
Wool, pounds..........	19,833	105,2[illegible]0	....	85,377	....	15,201.40
Goat Skins, pieces.....	3,37[illegible]	1,175	2,195	....	707 75	....
Tallow, pounds........	....	792	....	792	....	45 00
Molasses, gallons......	57,942	27,571	30,371	....	1,693 85	....
Betel Leaves, boxes....	82	102	....	20	....	135.00
Coffee, pounds..........	19,250	9,129	10,1[illegible]1	....	2,3[illegible]5.44	....
Sheep Skins, pieces....	4,385	3,637	748	....	....	10.70
Awa, pounds	9,6[illegible]0	3,885	5,715	....	614.00	....
Pineapples, pieces.....	1,389	900	489	....	1,[illegible]58 3[illegible]	....
Water Melons, pieces..	120	179	....	59	....	25 00
Plants and Seeds, pkgs	....	6	....	6	....	50.00
Sundry Fruits, cases...	570	133	4[illegible]7	....	2[illegible]5.00	....
Bones and Horns, lbs..	46,198	15,52[illegible]	30,678	....	329 58	....
Curios, boxes..........	26	1	25	....	1,035.00	....
Taro Flour, pounds....	2,680	....	2,686	....	232.50	....
Sundries, value........	$345.91	$1 070.70	....	$724.79	....	724.79

THERE is no reason in the wide world why Southern California should not supply the rest of the United States and British America with all the lemons they want.

CORRESPONDENCE AND SELECTIONS.

ELECTRICITY IN AGRICULTURE.

EDITOR PLANTERS' MONTHLY:—I have translated a recent communication to the Minister of Agriculture of Costa Rica relating to electricity as a fertilizer. If you deem it of interest to planters and others engaged in the cultivation of the soil, you may grant it a space in your columns.

L. F. ALVAREZ, M. D.

Waialua, Oahu, July 25th, 1893.

THE USE OF ELECTRICITY AS A FERTILIZER.

This is a new way of increasing the production of the soil. Its usefulness has been proved by repeated, and well conducted experiments. Its application is easy and cheap.

The electricity is applied to the soil as follows: To trees or poles 15 to 18 metres high, or higher if possible, is attached by means of insulators, a thick wire or galvanized iron bar ending in five copper wires in the form of a broom. This bar communicates, at the level of the ground, with iron wires buried to a depth of 10 to 50 centimetres, so as not to interfere with the working of the soil. The distance between the ground wires is 2 metres.

The electric action extends to a distance of 25 metres around the collecting bar. Hence 4 collecting bars suffice for one hectare or two and a half acres. This apparatus may last ten years, and will continue giving good results until the distribution ground wires get rotten. All experiments demonstrate that the electric action produces as good results as could be obtained from a thorough manuring of the soil. The land not only yields a crop 50 per cent larger under electricity but the quality is improved, and the maturing of the crop accelerated.

When both electricity and manure are used, the land gives wonderful results.

Several theories have been advanced to explain the favorable effects of electricity on the crops when applied to the soil.

Its action may be due to the nitrogen conveyed to the soil from the decomposition of the air; or it may act by producing a perfect distribution of the useful particles of manure;

or by dissolving and reducing to an assimilable condition the insoluble portion of the soil.

However, it suffices to know that such good results can be obtained, and that planters can find with little expense a new and abundant source of wealth to the country.

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ABOUT COFFEE PLANTATIONS NEAR MOUNT ORIZABA, (MEXICO.)

(Translated for the Planters' Monthly from the Koelnische Zeitung.)

The coffee plants require rich, deep ground and grow therefore best on the slopes of volcanic mountains and hills, where the red ferruginous soil is several yards deep and has been accumulating for centuries in the shade of the tropical forests, forming the best soil and food for coffee.

When starting a new plantation the forests are cleared but some shade trees are left, because the young coffee plants, and especially their tender surface roots, would not be able to stand the hot rays of the sun. Generally the seeds are planted in special beds and the young plants are then brought into shady nurseries. Here they are nursued for one or two years with special care and then they are transplanted to the regular fields, five feet apart from each other. In order to give the plants the necessary shade, bananas are planted between every second and third row. The bananas soon grow up and give enough shade for the plants.

In the second year the young plants commence to bear fruit and then keep on bearing for ten or more years, according to the richness of the soil and the cultivation. The average yield of a coffee tree is half a pound near Cordoba, but in other parts of the country, where the trees are planted farther apart and have more shade, they yield from one to two pounds annually.

The fields have to be kept clean and the plants trimmed now and then in order to secure a good crop. The gathering of the ripe fruit generally commences in October, and keeps on till March, but in the warmer districts, Porto Rico and Venezuela, the time for gathering the fruit is such shorter. The first berries gathered are not quite ripe and are very hard to be cleaned. The old method of the Indians of cleaning the berries was to put them on mats in the sun to dry, then they were pounded in hollow logs to remove the outer skin. In the new coffee plantations the fruit is put into cleaning mills which remove the fleshy skin or pulp, then it is soaked in water for twelve hours, to remove the hard skin from the berries. Then the berries are dried, polished and assorted according to their size, and the coffee is ready for the market.

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THE CULTIVATION OF THE ORANGE.

[From Jamaica Bulletin.]

Sir.—I had not the pleasure of listening to Dr. Neish's lecture on the "Cultivation of the Orange," but I have had great enjoyment in reading it, as it was reported in the *Gleaner* of 22nd inst. It is not often the privilege of a body of agriculturists to listen to a lecture like his, on a subject to them of special interest in which the historical, statistical, scientific and highly practical phases are so judiciously blended. It is to be hoped that the lecture will be freely and widely published.

Dr. Neish is of opinion that some of the seedling orange fruits grown in the island "are so good and so suitable for our trade that they are not likely to be surpassed" by those of imported trees; and he only recommends our cultivators to give trial to one exotic subvariety, viz., the "Selecta" of the St. Michael. A plant of St. Michael fruited here last year, but I regret to say the fruits were, in every respect, inferior to the ordinary Jamaica sweet orange. The majority, before maturity, burst their rinds, and even when ripe were comparatively sour. It does not follow that what is an excellent variety in the Azores will continue to present the same degree of excellence, under somewhat changed life-conditions, in the Antilles. Fruits, like men, are, specifically and individually, much affected in character by the cultured or scholastic influences of their environs; and I think, with Dr. Neish, that to improve the orange-trade interests, one of the first steps to be taken is to select stock plants of the best known sweet orange trees in the island, bestow on them distinctive names, and then propagate them, true to character and names, by budding and grafting, that they may be "generally distributed throughout the island." "With a special view to ascertain the best native kinds," Dr. Neish very considerately suggests that "it would be advantageous to bring about a competitive exhibition of fruits." A considerable sum of money, even Government funds, might be most profitably expended in this service, in offering liberal prizes for a series of sets of fruits, representing degrees of comparative quality, each set proven to have been gathered from a certain tree. The trees bearing the marketable fruits of the first class might then be ascertained, and with the permission of the proprietors, every effort at propagating the plants should be made.

Under the head of propagation, Dr. Neish has explained at some length a means of layering orange tree branches of moderate thickness, by which they are induced to develop roots, and in time might, of course, be severed from the tree and established in the soil on their own respective individualities; but even Dr. Neish thinks the plan has little besides simplicity to recommend it, and very properly advises those interested to propagate the sweet orange by means of grafting and budding—for the theory and *modus operandi* of which he also refers the interested cultivator to horticultural works. The propagation of certain sweet orange plants, as well as improved varieties or individuals of other tropical fruit and economic trees and shrubs, by these means, is very important, because, unfortunately, in the case of several, it cannot be done faithfully to type by means of seed.

And now, if I may be allowed to supplement what has been brought forward by Dr. Neish, I would beg to recommend and describe, briefly as possible, a system (by no means new) of inarching or grafting by approach, by which propagation of such plants may be ensured, and which, by its simplicity and perfect adaptability to the atmospheric and other cultural conditions obtaining here, recommends itself, above all other modes of grafting, to the non-professional operator.

Procure seedling orange plants, sweet or sour, one to two years old, from the thickness of a goose quill to half an inch in diameter. Place them singly in good soil, well compressed in bamboo pots, and nurse them until properly established.

They will then be ready as stocks on which to inarch the improved or favorite variety. Tie each pot separately to a branch of the favorite, strong enough to bear it up, and at the same time, at a point from which the middle portion of the stock can easily, and without much pressure, reach and lie parallel to a twig or small branch of the tree of or about the same diameter. The operator should now cut away leaves and spines, if present, at and near to the point on the stock above indicated, and then with a sharp thin-bladed knife, cut out of both stock and scion a longitudinal slice, from 2 inches to 2½ inches or even three inches long, gradually deepening about the middle of each cut to near the pith or half diameter, at the same time taking care that the cuts may be straight and in width at least equal, so as to readily allow their surfaces to meet without resorting to too much force. So important is it that the cuts on both stock and scion should be at least of the same width that, theoretically, the corresponding inner or lower edges of the barks should, when opposed, come into perfect contact; and with the beginner it will be as well for him to consider this as being absolutely essential to success. Having thus fitted stock and scion, they should now be bound together with threads of cotton or worsted, or with shreds of calico or bast from the inner bark of the mahoe tree. The tying material must not be drawn so tight as to either cut in or bruise the bark, the object being merely to keep the edges of the wounds in contact. In addition to such tying, it is nearly always necessary to wrap the wounds with shreds of calico, previously saturated with a solution of wax, oil, etc., purposely to keep out rain, as well as to exclude dessicating air.

Procure equal weights of beeswax and common resin. To a quarter of a pound of each add a teaspoonful of cocoanut oil, or even animal fat; put into a vessel and boil. This must be done close to the tree on which the operation is being performed. The shreds of calico should be one inch wide, and long enough to thoroughly wrap the wound. When ready take hold with the hands of both ends and let all but the ends sink into the boiling wax until saturated, then draw it across the edge of the vessel to dislodge all excess of wax and allow it to cool until it can be touched by a damp finger with impunity. This part of the operation is of the utmost importance, inasmuch as the application of the waxed cloth too hot will scald the tender bark, and thereby neutralize all hope of success ; on the other hand, if applied too cold, it is rendered unsuitable for the purpose intended.

When the requisite temperature has been attained, the waxed shred must be wrapped tightly and carefully round the wound, and this completes the operation. Kind nature will accomplish the rest. It is now only necessary to keep the soil in the pot moist ; and to prevent undue evaporation the space between the surface of the soil and the top of the pot should be stuffed loosely with either moss or hay. If the tree sought to be propagated is of moderate size, a hundred or perhaps two hundred pots might be fixed to it at one time. It would cost very little more to water and otherwise nurse two hundred in-arched plants than it would one hundred. In about six or eight weeks after the operation, with a view to aid in weaning, if I may so express myself, the scion from the parent tree, a notch should be made in the scion, immediately below the point of union, reaching almost to the pith. In two weeks thereafter the notch ought to be deepened, but not widened, through and slightly beyond the pith ; and finally, in a week or two weeks more, if the weather is moist, the scion should be severed and the new plant taken from the tree, shaded from the sun, and for a time most carefully nursed. It may be well to state that the beginner should not attempt to sever the scion from the parent tree unless when its leaves are developed and matured. When it is evident that the plant is out of all danger, and when active growth has set in, the stock above the graft should be cut back, a piece at a time, until finally fore shortened to the upper end of the grafted part. I much regret that so very simple an operation should require such a lengthy description as this, but without the aid of one or two simple diagrams I have, in justice to the subject, found it impossible to curtail it. I have, moreover, to say that as (simple as the above operation is,) I have failed to make it understood to your readers, I shall therefore be glad to give oral instruction with example to any one visiting Castleton. For the theory and details, descriptive and illustrative, of grafting in all its modes, I beg to refer readers to

"Baltet's Art of Grafting," published, I believe, at the office of *The Garden*, 37 Southampton Street, Covent Garden, London.

The popular opinion in Jamaica that the majority of the seeds of a sweet orange will produce sour orange plants is not quite well founded, though there need be little surprise felt if a goodly proportion of the trees are productive of sour fruits. It may be safely asserted that there are few good sweet orange trees in this island so isolated from inferior varieties, sour fruited shaddock, grape fruit, citron, lemon, or lime trees, as to be beyond the influence of the fecundating pollen of the latter. It is inferentially chiefly to this influence, rather than to an inherent tendency in the issue, that many seedlings raised from sweet orange seed, exhibit what may be and are termed degenerate or unmarketable fruits. I gladly grant that there is in a fertile plant an inherent tendency to produce, in characteristics, variable issue, but this is providentially over-ruled and in a great measure held in check by the prepotent law of sap-relationship or heredity, formulated in the words: "like produces like." And in this faith I would suggest that, just as early as possible, gardens, pastures and woodlands should be cleared, and rigorously kept clear, of most of the unprofitable fruit trees above named, with a view to ensure an extensive increase of seedling sweet orange trees.

From observations extending over four and a half years in Jamaica, I find that sweet orange trees generally bear a heavy and a light, or moderate, crop of fruit alternatively. I am of of opinion that what I have called the light crop might, in a general way, be made to assume the proportions of a good and profitable one, by the judicious application of suitable and requisite manure. For the manure to have this effect, it should be applied as a top dressing, and partly or wholly worked into the soil, about the *close of the crop*, in the season of *abundance*.

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BOTH Houses of the Colorado Legislature have voted in favor of a constitutional amendment extending the right of suffrage to women. Gov. Waite signed the bill on the 7th of April.

THE SILVER QUESTION.

[CORRESPONDENCE OF THE SUGAR CANE.]

Before 1873 this question was unknown, at least in its present bearing or aspect. The action of Germany in that year induced France to close her mints to the free coinage of gold and silver, and thus brought into view the inevitable consequences of England's mistaken policy when, in 1876, she adopted gold as the sole legal standard of value. Its ruinous results would have become apparent at once if France had not in 1803 established a joint gold and silver standard with open mints, for the free coinage of gold and silver at a fixed ratio of 15½ oz. of silver to one ounce of gold. France continued to do for all the world what England, after 1816, refused to do, and through the action of France, England still enjoyed the benefits of the joint standard which had existed in this country since 1257. This bimetallic law of France from 1803 to 1873 sufficed to maintain a steady ratio of 15½ to 1, although during this seventy years, at certain periods, the production of silver exceeded the production of gold by three times, and at others, three times more gold was produced than silver.

Thus silver was international money, with a fixed ratio to gold; but in 1873, it ceased to be money for international purposes, because the connecting link, the fixed ratio between the two metals, was broken. Silver standard countries like India, China, Japan, Mexico, etc., could no longer pay in money, but only in silver metal, by weight, worth more or less according to the supply and demand. Silver became a commodity, and instead of buying and selling in money, all dealers with silver standard countries had to resort to barter, giving or taking commodity against commodity. For international purposes, silver money was "wiped out" of existence; gold alone had to do the work previously done by gold and silver conjointly. Hence the "scramble for gold" and the steadily increasing value of that metal, as measured by commodities. All international debts payable in gold mean an ever-increasing quantity of commodities to discharge these debts. Whoever has commodities to sell must suffer from this continuous "appreciation" of gold, and it is self-evident that producing industries in gold standard countries cannot possibly prosper under such conditions. The "fixed income" classes alone are benefitted by the present condition of things; but there can be no justification for giving them more than their just due, or for robbing the industrious for the benefit of "the idle."

Lower prices in themselves are no evil, but the contrary, provided they are the natural result of cheaper production or of a more abundant supply. They are an evil if they result from a contraction of the currency, when, by an artificial money law, a monopoly is given to one metal to the detriment of all commodities, and by making useless the international purposes one-half of all the money in the world. This evil becomes all the more evident and presses harder upon the industries in gold standard countries when they are put in competition with the same industries in silver standard countries. In the latter all local purchases, wages, etc., are paid in silver, and thus a bonus exists in favor of these industries as compared with their competitors in countries where all payments have to be made in gold. It is for this reason that in England, the farming, cotton and similar industries competing with Eastern producers have become unremunerative. It is protection in another form, and there cannot be real "Free Trade" unless all competitors are placed on the same basis as regards the measures of value.

Gold and silver should be legal tender money in all countries of the world; capital would then flow freely to wherever it could find profitable employment; the Eastern countries would then be developed, and money would command a fair rate of interest instead of lying idle, as at present, through fear of losing part of the capital by a further fall in the exchange if employed in silver standard countries. Business would then cease to be a gamble, as it is at present, when neither buyer or seller in silver money knows beforehand what the price will represent in gold. Whilst all the drawbacks of the present system are so evident, whilst our producing industries are slowly but surely being ruined, whilst the state of all trades clearly points to the required remedy, still many people are afraid of adopting the system which worked satisfactorily when in force, and, at the same time, it has not yet been shown that one person would be hurt in his legitimate interests if we reverted to the bimetallic system in operation before 1873. What France did single-handed for seventy years cannot be impossible under an international agreement. The question of the particular ratio to be adopted may safely be left to be settled by international agreement, once the principle of bimetallism is conceded. As the present rate of production is about 20 to 1, and as the total stocks of both metals are in the proportion of about 18 or 19 to 1, it would seem a safe basis to adopt a similar ratio, or at least one which has not been exceeded in the total production of both metals from the earliest time up to date.

That a single gold standard has no special advantages as a means of encouraging trade is best shown by the trade returns of the United Kingdom, which for 1844 were 183 millions sterling. In 1872, when Germany demonetized silver, they had grown to 669 millions, whilst in the succeeding twenty years, when we ceased to have the benefit of the bimetallic law, they only grew 46 millions, namely, to 715 millions. On the other hand, the industries of silver standard countries have developed increased prosperity, as shown by the astonishing growth of the cotton mills in India, Japan, etc. Competition on the part of gold standard countries gradually becomes impossible, and whilst the cotton mills in the East pay handsome dividends, one hundred of the best and newest Oldham mills for the last fifteen years only show a return of less than 2½ per cent. per annum on the responsible capital, or about one-half of what an investment in consols would have yielded! Farming land in England is going out of cultivation, whilst the Indian farmer prospers. The low sterling gold price does not represent less money in rupees to him, but on the contrary, a further fall in exchange whilst the particular transaction is pending means an extra profit to him.

For the first time in the course of history the tonnage of British shipping shows an actual decrease, according to the latest return published. No wonder that, under these conditions, and with these clear proofs of declining trade, public opinion in England is rapidly coming round to bimetallism. A few years back a discussion on bimetallism would have been treated as a joke, whilst the last quarterly meeting of the Manchester Chamber of Commerce showed an overwhelming majority in favor of a joint standard by international agreement. Practically, all the English professors of political economy are on the side of bimetallism, and the Trades Union leaders look upon it as a bread-and-butter question of those employed in our producing industries. Even men like Archbishop Walsh and Mr. Leonard Courtney have felt compelled to openly declare in favor of the bimetallic doctrine, and the conversion of the latter means an actual majority for bimetallism of the members of the Royal Commission of 1888. The last division in Parliament on bimetallism showed an apparent majority against the bimetallic cause, but only because, at the last moment, the Government made it a Cabinet question, and thus compelled even some of the vice-presidents of the league to support Home Rule in preference to bimetallism. We have it on the dictum of Sir W. H. Holdsworth that but for this action of the Government a clear majority would have been shown in favor of bimetallism. Out of the eight members of the late Cabinet in the House of Commons, six voted in favor of Sir H. Meysey-Thompson's resolution, and if only Her Majesty's present advisers read correctly the signs of the times, there ought to be little difficulty, on the re-assembling of the Brussels Conference, in agreeing upon some plan which, if it be not bimetallism pure and simple, at least tends in the direction of establishing one universal standard or money measure in both metals.

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INSTRUCTION IN THE CULTIVATION OF THE GRAPE VINE.

(From Jamaica Bulletin.)

PLANTING YOUNG VINES.

Vines can be planted at any time of the year, but they will do much better if planted any time before May, as they get more light and warmer nights than if planted at the end of the year. Vines will grow in almost any kind of soil, but a good sandy loam suits them best.

The vine must be planted so as to be exposed to the morning sun; if they can have the sun shining on them all day, so much the better; but vines must have sun from early morn to past mid-day to do any good.

To give the vine an advantage, a hole about six feet square and eighteen inches deep should be dug, and if the soil is of a stiff nature one-fifth of sand, one-fifth of burnt rubbish and a load of short stable manure should be well mixed up with the soil. If the soil be very dry it should be watered so as to make it a little moist; when well mixed together the hole should be filled up with the soil. It is not advisable to plant vines in ground that has not been dug out or trenched to a depth of eighteen inches. At the same time, if anyone is going to plant a large number of vines, and the soil is favorable, the ground can be well dug twelve inches deep and a good supply of stable manure forked in at the same time. If the soil has been dug and filled in again, as I advised in the first instance, then the soil should be allowed to settle for at least a week before planting the vine; in the latter instance the vine can be planted as soon as the ground is dug. A dull day should be chosen for planting out the vines, if a dull day is not to be had, then the vines should be planted out in the evening. Every morning they should be covered over with something to keep the sun off for a few days till the vines have taken hold.

When the vines are being planted out, care must be taken to see that the roots are laid straight out from the centre; also that the base of the new growth just touches the soil, so that roots can form from this part. As soon as the vines are planted, the ground should have a copious supply of water; to wash the soil well in between the roots. After the first watering if done thoroughly the vines will not need watering again for about fourteen days. After that the vines should never be allowed to want for water till the end of September, by which time the vines should have made good growth. From September to January the vines should be kept without water to allow the cane to ripen.

When the vines are first established, a strong stick should be fixed for the vine to run up. The first season's growth should be concentrated into one main stem, so that as fast as the laterals and tendrils grow they should be pinched off.

DISBUDDING AND STOPPING VINES.

As soon as the vine begins to send out its shoots, care must be taken to have all buds rubbed off which are not required. As soon as the shoots get about three inches long they should show fruit if there is going to be any on the first growths. Most eyes that break will give off two or three growths. At the first disbudding, if there are three growths, the weakest one at each eye can be rubbed off; but if there are only two growths and of about the same strength, then care should be taken to rub the one off the furthest from the old wood, so as to avoid forming a long spur. After all but the best growths have been rubbed off at each eye, care must be taken not to let any more growths spring from the base of the first side growths. Do not allow the growths too close together; ten inches from one growth to another will be a good distance. It will be prudent not to thin the last extra growths off till it is seen what fruit there is; if there are no signs of fruit when the growths are about six inches long, it may be taken that there will not be any unless it comes on the laterals, as if often the case with black grapes. As soon as the disbudding is all over, the side shoots of the vine will soon have made about eighteen inches of growth. At this stage all growths except the leaders should be stopped at the end of the growth by having the point pinched out. The growths with fruit on can have the point pinched off at the third leaf past the bunch; those side growths without any fruit on must be pinched back to about the same distance. Soon after the points of the lateral have been pinched off, sub-laterals will begin to show; these must be allowed to grow till they have made five or six leaves; then they must be pinched back to one leaf; as fast as they keep growing the process must be repeated.

It is not wise to allow fruit to remain on the leading growths, so if there is any, it should be pinched off at once. Unless the vine is a good age, has a good main trunk, and is in good condition, it should not be allowed to carry all the bunches that come on; ten good bunches are better than thirty bad ones, and there is nothing that will ruin vines so much as over-cropping.

The leading growths should not be stopped until the vine has been growing about four months, then it can be stopped by having the point pinched out, this will cause the trunk of the vine to thicken. All the laterals must be kept off the leading growths.

As the vine gets covered with foliage the vine should get a great deal more water than it received during the first few weeks; the soil must never be allowed to get anything like dry. When the vine is coming into flower, it should have a good watering to carry it over that period, after that, it should receive a copious supply of water every week till the fruit begins to color; at this period water should be kept from it for a few weeks.

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FLOWER AND INSECT FRIENDS.

At this season the parks of Washington are abloom with the loveliest of summer flowers—the yuccas, which uplift tall spikes, sustaining great clusters of bell-shaped blossoms.

There is a story to be told about these blooms. It is a romance, in which the marriage of the flowers is accomplished by a creature of the insect world that plays the role of Cupid. Without the friendly aid of a little moth, the blossoms must all grow up in a state of celibacy and die bachelors and old maids.

In fact. all of these flowers which are seen in this region are doomed to perish without producing offspring. The moth does not live in this latitute, because it is too cold. Accordingly, the plants produce no fruit pods; they bear no seeds, and new ones can only be got by obtaining seeds from further south or by an artificial process.

Many plants depend entirely on insects for fertilization; without their aid they could not reproduce their kind. The yucca is obliged to rely on a single species of moth, which in its turn would quickly become extinct if it were not for the plant. Neither of the two could get along at all without the other.

If you will look inside the bell of one of the yucca blossoms you will find a central "stigma" surrounded by several "anthers." The latter bear the pollen, which must be introduced into the tube of the stigma in order to fertilize the flower and produce the fruit, which is a pod containing seeds. But the structure of the flower is such, the anthers being much shorter than the stigma, that this cannot be accomplished save by artificial aid. That is where the moth gets in its work.

At any time in the day, by looking carefully, one may find one or more of the moths resting within the half-closed flowers. It is necessary to examine carefully, because the insects are hidden by the likeness of their coloring to that of the blssom. If one visits the plants after

"——— the garish day
Has sped on his wheels of lights away,"

and when the yucca sends forth its perfume more strongly upon the night air, it is possible to discover the same moth flitting swiftly from flower to flower and from plant to plant. It is most usually the male that is thus found flying, while the female is busy at work among the blossoms. He can afford to amuse himself during the few brief days of life remaining to him, but she is charged with a double duty and loses little time in its performance.

Before she can carry out the maternal tasks of continuing her race she must act as foster mother to the plant. This is absolutely necessary from her point of view, because her young must feed on its seeds and can live on nothing else. By means of an organ formed expressly for the purpose, she collects the pollen from the anthers in big pellets. Laden with a mass of it she alights upon the stigma and thrusts the pollen into the tube, thus fertilizing the flower. Then she lays some of her eggs in the tube of the stigma, and flies away to repeat the operation on other blossoms.

Thus fertilized, the flower soon drops its petals and a pod begins to grow. Inside of the pod are seeds, and some of the latter are found on examination to contain young worms, which are the larvæ of the moth. They feed on the contents of the seeds. Each pod holds 200 or more seeds, but only some of them have worms, so there are plenty left to reproduce the plant. A few of the pods have no larvæ in them, which would seem to show that the insect does not always lay her eggs in the tube of the stigma after poking the pollen into it. When it is full grown the worm bores a hole through the pods and makes a silken string, by which it drops safely to the ground. It burrows a few inches below the surface and builds an oval cacoon of earth, lined on the inside with silk. Thus ensconsed it remain through the autumn, winter and spring. Summer comes, and as soon as the yuccas have begun to bloom the larvæ is transformed into a moth. After flying about to seek a mate it lays its eggs, if a female, in the manner already described, and thus the cycle of its existence is completed.

The only natural enemies of the worm are ants, which often get into the pods and devour the larvæ.

Such is the wonderful means by which the yucca plant is reproduced. The flowers can be fertilized by artificial means, but this is rather laborious, and the little moth does it ever so much better. On the whole, no more astonishing instance is known of mutual interdependence between animal and plant, each having to rely upon the other for the perpetuation of its species.—*Exchange.*

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NITROGEN IN RELATION TO AGRICULTURE.

[CORRESPONDENCE FLORIDA AGRICULTURIST.]

I enclose herewith advance sheets of our delayed May bulletin—which, if the Legislature had not monopolized the printing office, would have been out three weeks since. The article I send is upon a subject of profound importance and I have tried to give a popular resume of what is now known on the subject. I am sorry it is so long, but the field of discovery is so wide-reaching that it is hard to give a very brief statement that is at all complete.

NORMAN ROBINSON, State Chemist.

When something over thirty years ago the great French scientist Louis Pasteur entered upon his remarkable series of investigations concerning fermentations and ferments, no one could by any possibility have predicted the wide-reaching and brilliant results to which these researches would ultimately lead. If those of us who watched with eager eyes the process of these discoveries had then been told that this was the dawn of a new science—a science that would bring great changes to many of the arts and industries, that would profoundly modify medical theories and practice, that would revolutionize surgery, place sanitary laws ubon a new basis, and by uncovering some of the most jealously guarded secrets of nature, give agricultural chemistry a solid standing ground where previously there had been only the shifting quicksands of empiricism and conjecture, we should have hailed our prophet as a hopeless visionary. We should have smiled at his enthusiasm and taken refuge in the stoutest unbelief. And yet all this and much more than this has come to us from the new world of truth which this Columbus of science has given to our civilization and our favored age.

By far the most important field of inquiry which this new science of Bacteriology has opened up. belongs to the domain of agriculture. Even medicine which deals largely with abnormal life and upon which such a flood of light has by these modern researches been thrown, must yield the precedence of those wider problems which concern all life upon this planet. To-day underneath our feet in forest and field and grove processes of nature's chemistry are in progress, whose outlines we yet but dimly see and still more dimly comprehend, but which are more wonderful by far than any which our crude laboratories of scientific research can as yet imitate or explain.

Nitrogen, that strangely impassive element which makes up four-fifths of our atmosphere, until within the past few years has always been a mystery in its relations to plant and animal life. We live at the bottom of an ocean of it. We take tons and tons of it into our lungs. More or less it crowds itself into every tissue of our bodies. And yet so far as is now known not one particle of this all-pervading element ever directly enters into combination with those tissues. or plays the smallest part in the chemistry of organic life. So too with plants. They live in it. They breathe it in at every pore. But they do not assimilate it, and yet all animals and plants must have nitrogen. It is an essential part of their food supply. Not a cell can be developed, a leaf expand, or a tissue fulfil its functions without the active presence and intimate co-partnership of this strangely elusive and mysterious element. How then do leaf and cell and tissue get their nitrogen?

It may be truthfully said that animals obtain nitrogen as they do all their other necessary food elements from plants. "All flesh is grass," though, of course, in a modified and amended form. But this only puts the question one remove further away. How do plants obtain their nitrogen? Through what mysterious avenue does it find entrance to the primal seat and citadel of life?

Ten years ago the answer to this question was largely conjectural. To-day it is by no means complete. But a noble army of scientific workers, following in the path which Pasteur has pointed out, have thrown upon it a flood of light. Maerker, Hellrigel, Wolfarth and Winogradsky in Germany, Bertholet and Andre in France, Warington and Frankland in England and a host of others in Europe and in this country have been studying the intimate chemistry of plant life in the light of this new science of Bacteriology, and with most wonderful results.

PLANTS FEED ON NITRIC ACID.

As the outcome of the investigations of these eminent men it is now generaly conceded that nitric acid, either separately or in combination, is the form in which nitrogen is assimilated by plants. A soil destitute of this is found to be utterly barren. Even were it "rich" in every other element of plant food, with all that climate, mechanical condition, texture, drainage, water supply and every other known favorable agency combined, it could not be made to produce the smallest pretense of a crop. And yet even in the most productive soils nitric acid is present only in the minutest proportions. Often less than ten and sometimes as low as one part in a million can be detected by the most delicate chemical tests, and yet if all other conditions are favorable plants will grow and flourish. There are a number of causes which contribute to this result. Nitric acid while absolutely essential, and that too in constant supply, is required by plants only in homeopathic doses. In nearly all its combinations it is exceedingly soluble and any excess is likely to be carried away at once by drainage. In addition to this it is easily assimilated and rapidly removed by growing plants.

Now how does this nitric acid enter the soil? A small portion is carried down by rains. It was long ago demonstrated that nitric acid is directly produced by electrical discharges, and every lightning flash in a thunderstorm makes its little contribution to the stock of this much needed material. But the supply from this source is infinitesimal, and bears no appreciable proportion to the amount which growing plants require. Another source is the ammonia and ammoniacal compounds which are thrown off into the atmosphere by decaying organic matter and which by the rinsing of the atmosphere is again carried back into the soil.

But the great source of this nitric acid is yet to be mentioned. All decay of organic matter is effected through the agency of those micro-organisms termed bacteria. They are miscroscopic plants, somewhat similar in their habits and methods of growth to what are termed the "moulds." It seems to be their especial work to take down and take apart all organic matter which has served its term and become dead matter and pepare it to again take its place in the new and succeeding cycle of life. These humble organisms are like the type distributors in a printing office. After printing a paper types are not thrown away, they are simply taken apart, to be set up again for the next issue. So in the wise economy of nature there is no waste of previous material. It is all used over and over again. The bacteria are nature's "type distributors," and wonderful indeed are the processes by which the old and dead "forms" of matter are "unlocked" and prepared to be "reset" in the ever new and ever varying editions of growing life.

As early as 1862 Pasteur had published the suggestion that the production of nitric acid in the soil was probably the work of micro-organisms. It was reserved for two French chemists, Scholessing and Muntz, fifteen years later, to demonstrate what the genius of Parisian investigation had so early published as a happy and brilliant piece of scientific "guesswork."

Even yet the chemistry of decay is very imperfectly understood. The field is so wide and the processes so intricate that long years of patient investigation will be required to map out the outlying boundaries. A brief recapitulation of some of the most prominent known facts may, however, be permissable.

THE ATMOSPHERE LOADED WITH GERMS.

As has been said above, all decay or "rotting" of animal or vegetable matter is due to bacteria. The atmosphere is loaded with the germs of an almost endless variety of micro-organisms. No sooner does animal or vegetable cease to live than these humble workers begin their task of taking down and taking apart the dead and useless structure. Indeed they do not always wait for actual death, but are so eager and active for their task that weakened strength or impaired vitality not infrequently invites their visits, and thus they hasten, if they do not actually produce, the catastrophe of dissolution. It is this unfortunate characteristic which gives the study of the life history of pathogenic or such disease producing germs immense significance in modern medicine and which is scarcely less important in its relation to agriculture, to horticulture, and to the animal industries of the world.

It is then through the agency of these everywhere present bacteria that the waste and dead material of the world is prepared for use again. The mineral elements go back to the earth in simpler and more stable forms. Carbon is "burned-up" and returns to its original storehouse, the atmosphere, or, in the form of humus or humoid compounds, goes to enrich the treasures of the soil. The nitrogen, often by very roundabout and complicated steps, is wrought and re-wrought in this strange workshop of bacterial chemistry. Ptomains, leucomains, alkaloids and ammonias, in various known and unknown forms, are successively produced, and doubtless are but different and necessary steps in the wonderful chemical progression that leads up to assimilable nitrogen. Lastly, nitrous and nitric acid round out the cycle. "Dust to dust" is then complete, and the beneficent mission is ended of these wonder working microscopic plants in preparing what would otherwise be waste and useless matter for use again in the ever new and ever varying miracle of re-created life.

What are termed the "nitrifying ferments" belong to two distant classes, those that oxidize ammonia into nitrous acid and have no power to complete the work, and those that oxidize nitrous acid into nitric and thus render it directly assimilable by plants. Certain conditions of heat, moisture, and the presence of alkalies or alkaline earths are found to greatly favor if they are not essential to the process.

A CURIOUS PLANT PARTNERSHIP.

All this however has to do with nitrogen that has once at least been used and has already linked itself to the complicated chain of organic life. There remains still unanswered the great question how it originally gets into plants? Here, too, as before, the answer is bacteria. In all the wonderful facts which modern science has disclosed, I know of nothing more marvelous than the strange partnership which in the business of taking nitrogen from the atmosphere Hellrigel and Wolfarth have shown to exist between bacteria and one of the largest and most widely distributed families of plants.

The order leguminosæ is one of the most important known to botanists. It includes not only the familiar pea and bean, the vetch and clovers but an immense number of seemingly the most diverse trees, shrubs and plants. A simple enumeration of the known orders and species would fill a volume. Among drugs, we may mention cassia, copaiva, tolu, catechu, gum arabic, tragacanth, the tamarind, sandal wood and liquorice; among dyes and dye stuffs, indigo, logwood and Brazil wood; among trees the locust, rose wood, etc. Indeed, with possibly the single exception of the order Rosoceæ, this family of plants is probably the largest and most widely distributed on the earth.

While it is too early yet to pronounce positively it would seem that this whole world covering family of plants is at work, with the bacteria they harbor, in the business of gathering nitrogen from the atmosphere for their own and other's use. Indeed it would seem, as nitrogen is an essential link in the chain of being, that, if it were not for the leguminosa among plants with the humble micro-organisms they harbor, that all life on this planet would be impossible.

Not the least remarkable thing about this whole marvelous process is the manner in which these micro-organisms assist leguminous plants in the accumulation of nitrogen. Where they are present in the soil they occasion the formation of peculiar swellings or tubercles upon the roots of such plants. Upon a microscopic examination of these excrescencies the cellular tissue is found to be filled with the ramifying growths of these bacteroids, together with what are perhaps minute spores of the same. Stranger still if possible, it would seem that each kind of leguminous plant has its own particular bacteroid which is much more potent in the formation of these tubercles upon the roots of the species on which it is native than under other conditions. Prof. Nobbe, of Tharrand has made some very instructive experiments upon this very point. He has shown that if pure cultures of bacteroids from the pea are inoculated into the roots of a pea there is a greater growth, and more nitrogen is taken up, than if it is inoculated with pure cultures of the bacteroids, from the tubercles of a lupin or a locust. And so in every case when the matter has been investigated, it would seem that while all these nitrogen assimilating micro-organisms retain a modified power away from the particular plant upon which they naturally are produced, that their fullest efficiency depends upon their development in connection with the very species upon which they originally grow.

Those who have most carefully investigated the matter, do not claim to understand the exact manner in which atmospheric nitrogen is thus assimilated and rendered available for the sustenance of plants and ultimately of animal life. The importance of these discoveries in their relation to both practical and theoretical agriculture and agricultural science it is impossible to overestimate. The study of these fermentation phenomena is proceeding with rapid strides, and it is hardly possible now to predict what practical benefits may yet be in store for the tiller of the soil, in the unexplored domain of this new and fascinating science of Bacteriology.

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COCOA CURING IN CEYLON.

[CORRESPONDENCE OF JAMAICA BULLETIN.]

The following information received from Dr. Trimen, Director of the Royal Botanic Gardens, Ceylon, will no doubt be of great interest to planters in Jamaica and other countries.

"You ask about cocoa curing. We always carefully wash off with repeated ablutions every particle of mucilage from the seeds. No doubt this lessens weight, but much improves the sample and I think one of the principal reasons for the generally high price Ceylon cocoa fetches in London is the clean bright look of the bean. Another and perhaps more important thing is thorough drying. On estates this is always done by a current of hot air drawn by a fan through a small house, the seeds being spread out in layers on trays and turned over several times. No planter here would allow a speck of mould to be seen on a cocoa bean. I gave a description of the ordinary style of drying house for cocoa to Sir W. Robinson of Trinidad a few years ago and he printed it in the Agricultural Record of that Colony for 1890. I enclose a leaflet which is distributed with cocoa seed to the *native* villagers."

DESCRIPTION OF CEYLON COCOA DRYING HOUSE.

"The house is about twice as long as broad, built of brick, and is provided with double doors, but with the exception of the opening for the ingress and egress of the hot air, is hermetically sealed. The interior is fitted with a number of upright frames into which slide, one above the other, the trays upon which the beans are spread; these should be made of narrow pieces of split bamboo, not of wire or coir-matting. The heating apparatus is outside in contact with one end of the building, and consists of a large stove standing in a short tunnel which opens into the house. At the other end of the building, also outside, is a powerful fan, fitted in another short tunnel; this is worked by hand (three or four coolies needed) and by its rapid revolutions draws the air through the house. By passing over and round the stove the air is dried and heated; that which passes out is hot and damp. The flue of the stove passes under the floor of the house and contributes to warm it. A drying house of this sort is very simple and its cost only about 120 rupees; it does its work perfectly, and nothing more elaborate or costly is required.

"It is found desirable here to dry cocoa as slowly as possible, provided the risk of mould be avoided. This appears in the interior of the beans in twelve hours and on their outside in about twenty-four in wet weather if they are left cold, but by passing them rapidly through the hot air house, so as to have them hot when taken out, it is found that they will remain for a night or so in the store without injury.

"As the annual average number of rainy days in Ceylon is from 80 in dry districts, to 328 in the wet, and cocoa is grown only in the moist regions of the island we may assume that at least four-fifths of the cocoa exported from that Colony is dried artificially. The rainfall in the best cocoa districts of Trinidad appears to average between 80 and 100 inches. The total yield as before stated is 12,500 cwt., representing an enormous crop and an immense number of people dependent upon it."

"INSTRUCTION TO NATIVE CULTIVATORS OF THE CACAO OR CHOCOLATE TREE.

"1. *Localities, soil, climate, etc.*—Cacao is a completely tropical plant, and its cultivation should not be attempted above 2,500 feet, and only in warm situations well sheltered from wind. Flat ground is better than sloping. The climate must be moist, but a well marked dry season, if not too long, is no disadvantage. The soil should be deep and well drained; good forest soil is, of course, best, but that of native gardens is generally very suitable.

"2. *Planting.*—The seeds must be sown as soon as possible after they are gathered, as they quickly spoil for germination after becoming dry. Germination commences soon and proceeds very rapidly, and the young plants are very impatient of being transplanted, unless with the adoption of such precautions as will prevent any injury to the roots. Arrangements must, therefore, be made either for growing the seeds in a nursery in such a manner as to allow at least a foot between each seedling, so that they may subsequently be taken up with the earth about their roots, or for sowing them singly in bamboo or other pots or for putting two or three seeds in each place it is intended a tree shall occupy, afterwards allowing only the strongest seedling of these to remain. The last plan is the best for native cultivators. In plantations the trees should stand at from 10 to 15 feet apart, according to the richness of the soil, 12 feet being a good average distance.

"3. *Cultivation.*—It is necessary to shade the seedling plants when young: this is effected by branches fastened in the ground of any tree which retains its withered leaves—as cinnamon, mora, etc. There is no occasion to provide any permanent shade in most parts of Ceylon, but shelter from wind is of great importance. Plenty of light and a free ventilation of air are essential for the production of good and abundant crops. The ground under the trees must be kept perfectly free from weeds, and may be littered with decaying leaves and other vegetable matter. Manure is very beneficial. The trees should be kept from growing higher than 10 or 12 feet, and the primary branches be encouraged to assume a horizontal direction; redundant shoots from these or from the trunk must be pinched off when young. The principal trunk and branches should be kept very clean, and great care should be taken that the small and delicate flowers are not rubbed off or injured.

"4. *Gathering.*—A first crop may be expected on good soil in the third year. The fruit must be quite ripe before it is gathered; this is known by the rind having a yellowish color when cut into. The pods should be cut off cleanly with a knife, and not too closely to the stem. They can be easily split by a blow from a wooden mallet, and the seeds and pulp are then taken out and put into baskets to be carried to the curing place.

"5 *Curing.*—The seeds should be heaped together to sweat. This may be done in pits or boxes, or better on a platform covered with coir matting; the seeds should be covered over with matting, gunny bags, or a tarpaulin. Every other day they must be thoroughly turned over until the process of fermentation has gone far enough, which will be in seven, eight or nine days; on the proper duration of this depends the goodness of the sample. The mucilage and pulp round the seeds is now ready to be washed off, and this washing requires several repetitions with plenty of water. As soon as clean they should be at once spread out on mats in the sun to dry, avoiding, however, the extreme heat of the day, and in about three days they will be fit for the market. In wet weather the drying must be done by artificial heat in the house.

"When well dried the beans should be perfectly clean, with a thin pale cinnamon-brown skin, of one color all through, and entirely free from damp or mouldiness."

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The orange crop in Southern California this year has been the largest on record, amounting to about 7,000 carloads.

SHUN WORRY AND EXCITEMENT.

Regarding the preservation of youth and vigor, we find the average of longevity greater than 50 years ago. We find some men and women decaying and growing old much sooner than others. We find one man as fresh and vigorous at 55 or 60 as another may be at 35. There must be causes for these differences in the preservation of the body. And as there are causes for such variations in the condition of the body, may there not be other causes, still unknown, which may tend to preserve physical and mental vigor 100 years, or even longer? Mental worry and disquiet, arising from any cause, is the strongest agent in "aging" men or women. It is an incessant source of exhaustion to the vital forces. You do so exhaust yourself when you worry about your business, your family, and about anything. It carves lines on the face and bleaches the hair. A peevish young woman at 20 will look old at 30, because her peevish or worrying thought represents so much of her force used to tear her down instead of building her up.

You can have responsibilities without always worrying over them. You do not make things a bit better through such worry. You only make them worse. Worry does not plan. It does not make a clear head. It does but fume, fret, and cause indigestion and old age. It affects your sleep at night. It causes you either loss of sleep or a poor rest when you do sleep. If you carry your cares to bed with you and they are "on your mind" when you fall into slumber, they will stay on your mind all night and cause troubled dreams. There is a healthful sleep coming of the permanent, cheerful, composed, non-worrying frame of mind, two hours of which will give you ten times more rest, strength and refreshment than the unhealthful sleep coming of the mind which entertains care and worry and make them continual guests.

We often use up our force faster than we make it. We work through a whole day's exciting business, and are then at a theatre or some place of amusement until 10, 11, or 12 o'clock. So long as the body is awake there must be outlay of force to sustain it. There can be as much exhaustion in this search for excitement of amusement as in work. We get force to sustain the body in these ex-drafts upon it in two ways—either through artificial material stimulant or artificial mental stimulant. By artificial mental stimulant is meant the excitement caught and absorbed by crowds similarly influenced, and occupied as ourselves at night. It is not a healthful nor natural source of supply. It will eventually, if relied upon, strain the body and "age it" prematurely.

Mental stimulant and the mental intoxication coming from it is evidenced at noisy, turbulent public meetings, where thousands coming together, influenced by partisan prejudices, likes and dislikes, stamp and cheer, and cry themselves hoarse, according as the sentiments expressed are agreeable or the reverse to them. It is the stimulus produced by great numbers of minds acting on each other. It is exhausting, and every one of the participants feels the reaction within a few hours.—*N. Y. Sun.*

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REMARKABLE OPERATION ON A HORSE.—TREPANING THE SKULL WITH SUCCESS.

One of the most extraordinary operations in veterinary surgery ever performed in this country and the first of its kind in a field which has been making rapid strides of late years, has just been finished by a local veterinary surgeon. A part of the skull of a living horse has been removed over the brain and a silver plate is to be screwed into the opening. It is not the first time in the history of veterinary surgery that the skull of a horse has been trepanned, but never before was such an operation performed over the brain. Never before was a piece of bone taken from the cranial cavity of a horse.

The text books are silent on the subject; no instruments have been made to perform the operation, and nothing which might lead to follow in a beaten path has been done. The case in consequence is of extreme interest. The horse is alive and well, and one may look into the big hole gaping in his skull and see the living brain beneath.

The animal is a living example of what the more ambitious veterinary surgeons maintain for their art. They claim that the same operations which may be performed on man may be performed on horses, and that there is no operation known to the medical practitioner which cannot be applied with equal success to the practice of the veterinary surgeon.

The operation just finished successfully is a startling vindication of the claim. The time was that when a horse's leg was broken he would have to be killed, but that time has passed, and the mending of broken legs is quite an ordinary performance, having to do not alone with horses, but with many other animals. The mending of a horse's skull, requiring the greatest delicacy and absolute accuracy of touch, is quite another and a much more serious affair. but it has been done and successfully so.

The operation was performed by Dr. E. J. Creely, assisted by Dr. John M. Buckley. The animal is a valuable one, of excellent stock, but, unfortunately, down on his luck in the social scale of his species.

About a year ago the animal was owned by a wealthy horseman, who kept him for his own uses as a road horse. One day in a drive to the park the animal was run into by a vicious runaway. It was thrown down and trampled by the kicking hoofs of the runaway. A perceptible indentation of the animal's skull was made, but for awhile nothing in the way of a serious injury was noticed.

Then the animal began to act queerly. He was evidently losing what mind he possessed. He would trot along for awhile, then suddenly would stagger and rush off madly, colliding with whatever happened to be in his path. The owner could not stand that sort of thing, and the horse passed through various hands until it came into possession of the veterinary surgeon, who decided to remove the pressure evidently made upon the animal's brain.

He decided that the pressure was exerted by the parietal and frontal bones, and determined to trephine the skull. The animal's foretop was cut off and all the hair shaved away. One of the most curious features of the whole affair was the surgeon's intention not to use other than a local anaesthetic during his operation, but all he did in that regard was to inject hypodermically a 4 per cent. preparation of cocaine.

After waiting a few minutes a "V" incision was cut in the scalp and the membrane covering the bone was scraped away. The trephine was then brought into action, and five buttons were bored out of the skull. The animal never flinched, and seemed to be insensible to any pain. With the bone saw the five openings were made into one.

Then came the most critical stage of the whole operation, that demanding the greatest delicacy and the one offering hitherto the apparently insuperable obstacle to success. The brain of the horse is like that of man, covered with three extremely sensitive membranes. To injure any of them meant failure,. for it would set up an acute inflammation with a result in all probability fatal.

The bone had to be removed without harming any of the membranes, and it was done. The brain of the animal was revealed. A person could knock the animal down by a blow of the finger upon the exposed brain. After the operation the animal was carefully fixed in its stall, so that it was impossible for it to beat its head against any hard substance. During the whole operation there was not a sign of pain or suffering.

The horse is improving rapidly, and as soon as it is in proper condition a silver plate will be fixed in the cavity. The plate will, as a matter of course, be extremely thin, but of sufficient strength to withstand an ordinary pressure. It will be screwed into place, and its owner will have the distinction of having the most curious horse in town, and the first animal whose skull was ever successfully trepanned.

The animal has now passed all danger from inflammation of the brain, and its complete recovery is simply a question of time. It is believed also that the peculiar and erratic actions of the animal, due to the pressure on its brain, are over.

The operation is remarkable, not simply because it is the first of its kind ever attempted at any time upon an animal, but because it shows the analogy of method between those who operate upon men and animals of a lower kingdom. To veterinary surgeons it is, of course, of extraordinary interest, and will be discussed fully in the *American Veterinary Review*. To those who have no interest in such things it is remarkable, because it exemplifies the great progress made in a science which is only a few years old.—*S. F. Chronicle.*

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BEAUTIFY THE HOME.

[CORR. N. Y. INDEPENDENT.]

In traveling through the rural districts of our country, and especially in the West, nothing impresses one more strongly or painfully than the careless and even slovenly appearance of the average farmer's home. Indeed, it lacks most of the elements which should belong to a home. It is rather a place in which to stay rather than a place in which to live. It supplies only the absolute necessities which Nature imposes. It is hardly more than a shelter from the weather, a protection for the animal nature. We have often seen barns for the stock very much better and more costly than the house for the family, the barn neatly painted while the house was unpainted and dilapidated. And we have often seen the house in the midst of the cowyard, the fowls, swine, cattle, mules and horses the companions of the family outside, and not unfrequently some of the animals having free access inside. The house and barn in close companionship, thus situated on the naked prairie, is sufficiently uninviting and repellant.

Such a home and surroundings are a most unfortunate mold for the character of children. Instead of beautifying, it mars and defaces the native prairie. A feeling of pain makes us turn our eyes away and hasten fast. The average farmer utterly fails to appreciate the value of beauty. It does not seem even to occur to him that there is any value in it, and that it is of any importance to him or to his family. His whole thought and effort are given to raising grain and stock and perhaps improving his fields, while the home is utterly neglected, and as barren of beauty, pleasure, or even comfort, as a desert. He misses the choicest element, the very cream of life.

No one has such an opportunity for making the home a little paradise as the farmer. The first and most essential requisite he has in abundance—viz., the broad acres. With neighbors at a distance, and land worth only from $5 to $20 an acre, his grounds for culture and the development of beauty may be as broad as he likes. Those living in town are cramped up in a very small space, with lots only 25, 50 or possibly 100 feet front; and yet it is surprising to see what a wealth of beauty a little taste and labor will produce on a 25-foot lot, and how attractive the home, a constant invitation, pleasure and rest to the business man, wearied with the toil and disgusted with the anxieties and annoyances of business.

There are towns which are distinguished for their beauty and attractiveness the country over. Their beauty invites the best class of people, and causes a rapid growth in population and wealth. People of wealth seeking a home and place to train and educate children look for these towns. And in these towns and cities property on the streets which have been highly cultured and made beautiful is worth in the market many times more than on other and perhaps adjoining streets. Cleveland, Ohio, is noted for its Euclid Avenue, and the one feature of Euclid Avenue is its beautiful homes, and the beauty is not so much in the architecture as in the spacious, high-cultured grounds. Kalamazoo, Mich., is distinguished in the entire State as its most beautiful town, and its beauty and attractiveness invites population and wealth and help schools and churches and business and growth and prosperity in every direction. Madison, Wis., is having a fine growth in population and wealth, not because it is a natural business center, which it is not, or because it is the Capital of the State, but because it is the most beautiful town in the State, and so the most attractive and desirable for a home. There are towns in New England which attract population and grow by their beauty. City people seeking a summer residence and those seeking a place in which to educate children, or to spend the happy evening of their days, turn instinctively to these beautiful towns, and the streets where the grounds are most spacious and the lawns and flowers and trees most abundant, and without much reference to the cost of the home. Beauty becomes not only a source of happiness, but a harvest of wealth wherever it is developed.

The contrast between the rural districts of England and America in this matter is very great, and greatly to our disadvantage and loss. Is not the beauty and attractiveness of the home a chief reason why so few English farmers leave England, while the unsightliness and wretchedness of Irish homes is the reason why so many of them leave Ireland?

It will be said that the American, and especially the Western farmer is too poor, that he cannot command the means to beautify his home. This is a very sincere, but a very mistaken idea. It is not money, but taste and odd hours which are required. A beautiful home is a luxury in which the poorest may largely indulge, and it is about the greatest luxury of life. With his ample acres the farmer may make his home in the center of a little park, which shall grow every year more and more beautiful as long as he lives. Let him in the beginning set apart from two to ten acres, as a park or home grounds, to be carefully and neatly fenced in and protected. It will take but little time and labor to turn at least a portion of these acres into a beautiful velvet lawn. The change from the muddy, filthy cowyard to the smooth, green lawn can be made with small labor and at odd hours. It does not take long to plant a tree, and when once planted Nature will take care of it. From year to year for the next fifty years, or even for a century, if will increase in size, in beauty and in value. There is many a tree in Old England and in New England which could not be bought for $1000. There is a beauty and magnificence and charm about them, and even a kind of companionship against which you can hardly place money. Home would not be home if they were gone. They are a constant benediction upon the home.

The old elms of New Haven are the charm of the city. And the farmer, with his broad acres and a little work could have, after a time, the weeping elms with their magnificent and graceful forms, the hard maple with its stately and shapely form and highly colored autumnal foliage, and the grand oak and the evergreens and ornamental mountain ash, and in fact a hundred varieties if he desire. A friend in Pennsylvania placed his home in the midst of a little park of fourteen acres, in which he had planted some 200 varieties of trees, with accompanying lawns and flowers; and as they grew the park became almost a paradise, and its money value increased with the beauty.

It takes a little work to cultivate flowers, but there is nothing which runs more rapidly into value, nothing which pays so high an interest. The endless variety of flowers at command, and the wealth of beauty to be developed, produces not only the highest pleasure, but a commercial value exceeding that of any other crop. The lawns, the flowers, the vines, the trees, are at the command of every farmer. There is practically no limit to the beauty and pleasure and value with which the farmer may surround his home.

An expensive house is by no means essential to the most attractive, enjoyable and even palatial home. The finest and most costly production of human art and architecture is of small account when compared with the beauty which Nature produces. The inexpensive but neat one-story cottage of the poor farmer in the midst of his little park, in the elements of beauty, and in all the elements of happiness, may be more than equal to the palace of the millionaire. Jay Gould's castle on the Hudson is nothing apart from the grounds, the lawns, the flowers and the trees. Those who visit it go to see the grounds, the art of Nature and not the art of man. The same castle on the bare prairie or in the cowyard would attract no visitors.

It is to secure the broad acres and room for the little paradise of beauty that the millionaire goes to the country for his home and happiness. His city residence is only a place in which to stay while he makes his money. His country home is the place where he lives and finds his happiness. He works and makes his money in the city to spend it in his country home. The farmer has the ample space and all the natural advantages, and with a little taste and labor could easily rival the millionaire in the beauty and happiness of his home.

There is also a high commercial value in beauty which the common farmer fails to discover. One wishing to buy a farm will always select the one with a beautiful home, other things being equal. Nothing the farmer can do will make his place so salable, or add so largely to its commercial value as the development of beauty about his home. Every rod of lawn, every tree, every vine, every flower, every object of taste or beauty, adds to its value in the market. The growth of every tree is adding, and largely, every year to the value of the farm.

Thirty-five years ago Central Park, N. Y., was the most unsightly, repulsive spot you might see in many a day's travel. Passing by that locality in the cars we were accustomed to shut our eyes or occupy them inside the cars, to avoid the disgusting sights. Barren ground, mud holes, jagged rocks, swine, goats, geese, shanties for the poorest, most depraved and beastly part of the population, the refuse, the off-scouring and dumping ground of a great city. To-day it is the most beautiful and attractive spot between the two oceans. The mud holes have been turned into beautiful little lakes, with white swans gliding gracefully over their bosom, spanned by bridges which are works of art; their borders decorated with lawns, flowers and trees. The rough rocks are covered with vines and flowers. Every unsightly and repulsive spot has been turned by the hand of the skillful artist into a scene of beauty. It is now the chief attraction of the country's metropolis.

What the city of New York has done for itself in Central Park, the farmer may do for himself on a smaller scale with a little taste and work, in making a little park about his home. The grass, the vines, the flowers, the trees, will grow as beautifully on the prairies about the farmer's home as in Central Park.

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COCOANUT TREES.

While the cocoanut tree abounds in South Florida it is not a native of the section, nor has it been cultivated here for any great length of time. About sixteen years ago a Bahama vessel was wrecked off the coast, near Jupita Inlet. Soon after the waves began bringing the cargo ashore, among which were found a large number of cocoanuts. Residents were very few in this section at that time, but they gathered together and appropriated whatever came to them.

These cocoanuts were considered great prizes and were at once planted. The soil was found to be favorable to the growth and they thrived wonderfully. Thus was introduced the culture of the nut upon the soil of the North American republic. In Dade county, one of the southernmost counties of the State, which has a front of 150 miles, there are now groves of great beauty containing from 100 to 600 trees.

Cocoanut culture is very simple. The ripe nut is plucked from the tree and, in the outer husk that surrounds it, is put under ground, lightly covered with soil. The first shoot should make its appearance in one month after planting, but it is often two before it comes. When it is about a foot high it is transplanted to its permanent resting place. If the nut is planted as a nursery stock the husk is left on, as the young plant is very tender, and it seems that a growth out of the husk has a tendency to make strong joints. If it be first planted where it is to remain the husk is usually removed.

For the first year the plant requires careful protection from the winds, but it gradually grows hardy, and at the end of six years begins bearing. The blooms make their appearance —a dozen or more fingers, looking like grains of corn strung on wire about a foot in length. These grains are young nuts.

They ripen in a year's time, and thereafter until its death the tree is never without fruit in various stages of ripeness, from a tiny lobe the size of a pea to ripe nuts, and there is not a day in the year when the ripe nuts cannot be secured. It has been demonstrated in other countries that the cocoanut tree will bear fruit for twenty-five years. To what age they live has not been ascertained.

The trees make a most beautiful and imposing grove, being truly tropical in their appearance. As they are planted ten to twenty feet apart, they cast a thick, unvarying shade. They are evergreen, as is most tropical foliage, and their gracefulness, with the great height they attain, makes them a desirable addition to a home in the far south. The diameter of the tree ranges from one foot to two, and they attain a height of 125 feet, having as many as 400 nuts on them at one time.

The old fashioned method of grating the nut has been superseded by a machine for grinding, and the residents of the southern country keep on hand for their use a fresh supply of homemade desiccated cocoanut, from which various toothsome dishes are prepared. The product is becoming more generally known by reason of its excellent fiber, and the "cloth," a strong, fibrous bark, that grows far above the ground and is utilized in many ways. If the use of cocoanut butter ever becomes common, the owner of these trees will see his fortune ahead. The butter is made from the oil of the nut, expressed by machinery.

Even the raw grated nut is an excellent substitute for "shortening" in bread, the grated nut in the same quantity being substituted for lard. The cooking process seems to destroy entirely the vegetable taste and appearance, and biscuit made with it are pronounced as good as real cream biscuit.

Shorn of its cocoanut growth, a tropical country would certainly be less attractive in appearance. The long, feathery leaves that undulate so gracefully in the breeze which sighs among them, the "everlasting green" of their coloring, their tall stateliness and their symmetry beautify the whole country where they grow—especially the south Florida country, where they grow in such profusion.—*San Mateo Item.*

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ONE THOUSAND DOLLARS AN ACRE.

A census agent employed on a Sacramento river district came to a Chinese garden where water was pumped from the river on eight acres of land. The agent showed that he was working for Uncle Sam and must have the exact truth on pain of some such severe penalty as the confiscation of his queue. In response he said he cultivated eight acres; that his books showed sales of vegetables to the amount of $7000, and that many small cash sales did not go down; that the whole had probably reached $8000. He pumped the water on his land with two horses, and said that with plenty of water he could make his sales reach $10,000. We may well conclude that vegetables, cow feed, etc., can be grown on two acres to feed a family of seven persons. If, therefore, a man has ten acres, he could plant eight to fruit and use two for vegetables, etc., and a comfortable living could be made. A family of seven could do all the work on such a tract. This can be done without bringing the land anywhere near up to the productiveness of the Chinese garden. But to do this we must have water—cheap water. On the other hand, we know of land held at $70 to $80 an acre that has not paid the owner 3 per cent. interest on $50 an acre. The difference is in having and not having water.—*Colusa Sun.*

"AN AWFUL WASTE."

(From the American Grocer.)

That wonderful inventor, Edison, has faith in his ability to devise means for controlling the energy which is stored up in coal, so that it may be employed without waste, and at a very small margin of cost. It is claimed that 90 per cent. of the energy that exists in coal is now lost in converting it into power. It flies away in all directions and is, as Edison says, "an awful waste."

What a revolution there will be when this 90 per cent. is controlled! It would reduce the coal-carrying space of the ocean racers to one-twelfth their present capacity. It would make the cost of manufactured goods so low that present prices would seem almost fabulous in comparison. There are almost limitless probabilities in that present "awful waste."

In every direction and in every walk of life there is an "awful waste" of energy. Men dissipate mental and physical energy; they throw away resources with a recklessness that is appalling. The measure of a man's success is in ratio to the utilization made of his resources. Mr. Gladstone in his 84th year astonishes the world by his activity and parliamentary skill. He wastes neither time nor energy. Other men of equal natural ability are club-loungers and society lions, contributing little or nothing to the good of their fellows. Edison is another example of what one man can accomplish who does not contribute to "an awful waste."

Recently, while standing at a country crossroads, we asked a wiry-built woman sitting in an open wagon to carry us to the next village. She proved a good example of utilized resources. She was known to us as a woman of good family, of great energy; a tireless worker. Her husband, the son of a farmer, was put to work early in life, in order to pay for a substitute for his father, who was drafted for the Civil War. At present he is a laborer on the railway and earns $1.15 per day. We passed the home of this couple, a neat two-story house with small farm—worth $2,200—which place the woman saved from her earnings, besides having had the care of six children, four of whom sickened and died. The husband's illiteracy forbids his doing other than menial work. This woman is fond of music, and in order to gratify her taste, bought and paid for a piano with the result of her toil. The little two-seated wagon drawn by a stocky black horse, is being paid for in the same way. She has social standing in the village where she lives, being a worker in advancing religious and social life of the place. Her use of her resources is such as to command the good-will and respect of the community.

If we go to the race track or the ball ground during business hours we have an illustration of how thousands of so-called business men throw away their resources. Others are mindful of the demands of business, but waste their resources at night, in sensuous pleasure-seeking.

Among recent financial wrecks was one brought about through the devotion of one member of the firm to wasting his resources. After bringing ruin to his best friends he was sent to an asylum, a physical wreck through debauchery.

Not long since we followed to the grave, from the same asylum, another popular young business man—one of the hardest workers we ever knew. He wasted the hours after business in a manner which drained physical resources and his net earnings.

Some of the brightest young men met in business circles contract habits that are a continual drain upon their own resources and those of others. They waste 90 per cent. of their available energy.

Thousands of retailers waste their opportunities in a reckless way, letting hours in every day go by unemployed. They sit and wait, instead of making their stores so attractive as to invite and interest customers.

Time returns an immense dividend to those who employ it aright, and exacts a fearful penalty upon those who waste it.

If the saving of 90 per cent. of energy of coal would revolutionize the physical economy of the world, what a moral revolution would roll around this globe if 90 per cent. of human energy was properly employed! There would not be such wide differences between the condition of nations and individuals, were all to seek the highest possible employment of their resources. Do we feel the responsibility of employing our resources? If not, are we not drones in the human bee-hive?

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A PERFUMERY FARM.

W. M. Preston of New York, a representative of one of the largest perfume manufacturers in this country, Solon Palmer of New York, spent last week in Pomona, and will spend the next six weeks in this part of the State. Mr. Preston informed us that Solon Palmer has about decided upon the location of a flower farm in Southern California, and that he is here for the purpose of looking over the field and to conduct a series of experiments in each locality to determine the distilling quality of the flowers from which perfumes are extracted. He says Mr. Palmer has made up his mind that the best place on this continent for the full and natural growth of flowers of the most numerous variety is in California. About all the floral oil now used in the manufacture of our American perfumes comes from France or from Algiers, Morocco or Sicily, and the import duties upon all of thes luxuries are now very heavy, and are likely to be made heavier by this Congress. Mr. Preston says that not less than twenty acres would be wanted for the proposed flower farm, and that it would take several years' careful cultivation by experienced flower gardeners to get half the plants in good condition for extracting oil from them. The work of distillation of the floral oils is very delicate and performed only by men of experience. A flower farm such as Mr. Palmer is talking about would keep not less than a dozen men busy all the year round, and twenty men for about four months in the year.—*Pomona Progress.*

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WHEN a stitch drops out of the main engine belt, don't trust to luck to run till noon or night, but shut down at once, as soon as the defect is discovered, and repair the damage. Perhaps it will take five or ten minutes to put in two or three stitches of lacing and the whole shop's company must stand idle during the length of time. No matter, let them stand. The loss is not over five cents per man, or $3.25 for the whole

65 of them, and this would not be a circumstance to the loss that might occur were the attempt made to run the belt without the slight repairs that could be made during the five minutes' stop. In one case the neglect of just such trifling repairs one day, the defect being discovered just as the engine was being started at noon, and allowed to run in the hope that it would go till night—that time the neglect was fatal. The belt " let go " about three o'clock, and a whole hour was lost in fixing what could have been done in five minutes at noon. The foreman of that shop learned the lesson, and you can do so from his example without the loss of $39 worth of time among a shopful of men.

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A fact not generally known is, that barn-yard manure loses in a few months 50 per cent. of its nitrogen. This may be obviated by watering the manure with a weak solution 3 per cent. of bi-sulphide of lime, using about 4 lbs. of this product per ton of the manure. After a very short time the bi-sulphide is converted into a calcic-sulphate, or plaster, and the ammonia into nitric acid: this latter change does not occur when plaster is used alone.—*Sugar Beet.*

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METEOROLOGICAL SUMMARY.

FROM RECORDS OF THE WEATHER BUREAU.

PHENOMENA.	*Jan.*	*Feb.*	*March*	*April*	*May*	*June*
Average temperature ....Fahr.	70	71	72	73	75	75.2
Average morning minimum	65	65	67	69	70.5	70.9
Average mid-day maximum..................	76	77	78	78	81	81.7
Lowest observed temperature	56	61	63	65	65	67
Highest " "	81	81	83	83	83	84
Smallest daily range of temp.	4	6	3	5	6	8
Greatest " " "	18	19	18	17	18	17
Greatest diff. betw. 2 consecutive days.......	6	5	4	3	3	3
Relative humidity ....per cent.	74	79	71	70	69	69
Rainfall ....inches	2.88	14.91	1.31	2.32	2.22	0.64
Trade-wind ....days	15	6	15	23	30	30
Fine ....days	13	8	14	15	12	15
Fair ....days	7	4	6	7	9	8
Lowest barometer	29.84	29.75	29.96	29.96	30.00	30.03
Highest "	30.16	30.22	30.25	30.24	30.22	30.24
Average force of wind, Beaufort scale	3.5	2.5	4.5	4.5	4.2	4.0
Daytime cloudiness ....per cent.	46	60	42	48	47	43

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