One of the marked salmon turned into the Columbia River from the hatcherup in 1895 has been captured, weighing thirty-eight pounds. From this and other evidence it is concluded that salmon mature in four years or less, and it would seem that they return to their original spawning grounds—S. F. Grocer.

It has been found in Germany that lightning rods do not protect high chimneys, the electric discharge preferring to pass to earth by the column of heated smoke, which, being rich in carbon, is a conductor of electricity. It is partly for this reason that so many smoking chimneys are struck by lightning, and that to sit near a fireplace is dangerous.

While the American and European markets have shown no material change in the quotation of raw sugars, the general impression is that there will be some decline in the price of refined sugar in the New York market. The European beet sugar crop will be less than last year, owing to unfavorable weather. Latest advices quote 4½ cents for Cuban centrifugals, 96° test.

The weather throughout this group has been favorable to the growing crops of both sugar and coffee, although in some
districts more rain would have been very beneficial to both. The coffee crop will increase each year from now on, and some of the plantations may find difficulty in procuring laborers to gather the cherries, at the proper time. It will be well for all planters to engage their laborers ahead, even employing women and children for this light work.

Among various interesting general items in the last report of the United States Bureau of Statistics, we note the arrival for the year ending June 30, of 229,233 immigrants, of whom 58,606 came from Italy, 39,780 from Austria-Hungary, 27,194 from Russia, 25,128 from Ireland, 17,072 from Germany, 4,275 from Turkey, 2,280 from Japan, 2,071 from China, and 10,737 through Canada. Of the total 127,162 were males and 90,558 females.—Ex.

In reply to a question as to the relative saccharine qualities of sugar cane and sugar beet, Messrs. Willett & Gray state that the product of a ton of 2,000 pounds of sugar cane is 130 pounds plantation granulated and 30 pounds of seconds and thirds. The product of a ton of 2,000 pounds of sugar beets in Nebraska is 220 pounds granulated. In connection with the foregoing, it is pointed out that the cost of a ton of sugar cane and the expense of extraction of sugar therefrom is less than the cost of a ton of sugar beets.

Did it ever occur to you who own land, that you are the possessor of the only natural property, a portion of God's footstool? This is the only property direct from the Mighty Maker. All other property is artificial, to preserve which you watch it, put it under lock and key, or insure it. But who ever heard of insuring land or setting a watch over it for fear it would be carried off? Land is the original gift of God to man, and is the source of all other wealth. All other forms of property owe their existence to this original, and could not continue to exist without it.—Exc.

It seldom falls to the lot of one man to gain the first and last battles of a war, as Admiral Dewey has done. On May 1
he destroyed the Spanish fleet in Manila harbor, and on August 5 (the day following the signing of the peace protocol with Spain, news of which had not reached him, he took Manila). That Vermont Admiral has shown himself a wise, able, brave, energetic, self-controlled, loyal, plucky Yankee, possessed of unusual tact and great executive ability. We are justly proud of the Admiral and his record.—Am. Gro.

To Keep Flies Off Cattle.—Cut this out and paste it in your hat for fly time: To keep flies off the cattle, take coal tar two parts, and coal oil and grease one part each, and mix with a small amount of carbolic acid. Apply with a cloth by moistening the hair and horns with the liquid. In the application include the feet and legs, and it will drive every fly away; and one application will last ten days or more in dry weather. Apply as often as necessary and your cows will be entirely free from flies of all kinds. Any kind of old lard or grease can be used.—Garden and Farm.

The new Waialua Sugar Plantation on this island is soon to be commenced under the auspices of the agents, Messrs. Castle & Cooke. Mr. W. W. Goodale, at present manager of the Onomea, Papaikou and Paukaa estates on Hawaii, where he has been very successful in developing the outcome, has been appointed manager of the Waialua Plantation, and will assume control at once. He arrived here on the Kinau a few days since, with the intention of going to Boston, but has changed his plans and accepted the offer made by the directorate of the new plantation.

It is often said that "Christians are no more honest than other people." Whatever of truth there is in that requires the substitution of the phrase, church members, for "Christians." There is not a dishonest Christian in the world, and never was. A dishonest man is not a Christian. He may bow his head, cross himself, or weep at the name of Jesus, soar on wings of ecstasy when he hears descriptions of heaven, and recount with unction the date, the hour, and the minute of his conversion; but if he is dishonest he is not a Christian.
The fundamental maxim of Christianity is: "Provide things honest in the sight of all men."

The largest combined harvester in operation cut a swath fifty-two feet wide. It cuts, threshes, and sacks the grain, ready for market, as it proceeds. The bags come out of the machine at the rate of three a minute, which would make 1,800 sacks in a day's run of ten hours. Three sickles are used end to end to reap the grain, and one separator handles all the grain. The power used is traction engine. The ordinary combined harvester cuts a swath from sixteen to thirty or forty feet wide, requiring from twenty to thirty mules or horses. Four men usually constitute a crew. From thirty-five to nearly one hundred acres a day are harvested.

"Whoever has read Mr. Stanley's book must feel the profound pity and the consideration which he cherishes for the native Africans, without distinction of stature or tribe. It is owing to Mr. Stanley, who was the first to ask England for missionaries, that Uganda is to-day a Christian country, with cathedrals, churches, and schools. It is owing to Mr. Stanley that the banks of the Congo, once infested by horrible cannibals, are inhabited now by a peaceful and civilized people. Mr. Stanley was the pioneer of that happy civilization so magnificently propagated by the King of the Belgians, who has put an end forever to the slave trade in his Congo State."

—Mrs. Stanley.

U. S. SUGAR BEET ACREAGE.—The following table gives the estimated area devoted to beets in the United States during the last five years, in acres:

<table>
<thead>
<tr>
<th></th>
<th>1897</th>
<th>1896</th>
<th>1895</th>
<th>1894</th>
<th>1893</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>32,086</td>
<td>23,617</td>
<td>14,948</td>
<td>12,362</td>
<td>13,288</td>
</tr>
<tr>
<td>Nebraska</td>
<td>7,000</td>
<td>8,000</td>
<td>5,000</td>
<td>4,421</td>
<td>3,000</td>
</tr>
<tr>
<td>Utah</td>
<td>3,000</td>
<td>4,320</td>
<td>3,000</td>
<td>2,755</td>
<td>2,700</td>
</tr>
<tr>
<td>Virginia</td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>New Mexico</td>
<td>2,000</td>
<td>1,300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>1,150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The acreage for 1898 will probably exceed 60,000 acres.
The first cargo of bananas sent from Costa Rica to the United States, says an exchange, left Limon in February of 1880, and consisted of 360 bunches, which an enterprising planter picked from the plants growing between the rows of his coffee shrubs. The experiment succeeded so well that he concluded to let the coffee go and stick to banana culture exclusively. Four years later there were 350 banana estates in Costa Rica. Fruit companies had been established, steamers got expressly for the trade, and the annual output was averaging 500,000 bunches. Now there is scarcely a hamlet in the United States where bananas may not be found at all seasons of the year, most of which come from Central America and the West Indies.

Referring to the plan to pack sugar by means of a machine in the possession of the Arbuckles, Messrs. Willett & Gray say in their circular: “They have had this machine in use at their coffee factory for some years packing granulated sugar in two pound bags. Their new sugar refinery now packs granulated in two pound and five pound paper bags, put up as follows: Two pound packages, packed 48 in a case, 250 cases to a carload—say 24,000 pounds net. Five pound packages, packed 24 in a case, 200 cases to a carload—say 24,000 pounds net. When a mixed carload of cases and barrels, or 100 pound bags is required, it will be made up at a minimum of 25,000 pounds net. It remains to be seen whether there will be any considerable demand for the small paper packages. Possibly at the start a good business may be done in them because of their novelty to the trade generally.”

The editor of this journal offers for sale a very desirable property of about 45 acres, on Hawaii, suitable for a small coffee or fruit plantation. There is now on the land a good dwelling house, with barn and other out-buildings. The land is located in a healthy district, noted for the salubrity of its climate, and in a pleasant neighborhood, and is about two miles from the seashore. Several varieties of trees are growing on it, including 30 orange trees, two acres of coffee trees, etc., which thrive well. For any one desirous of locating in
a pleasant and healthy neighborhood, who has the means to purchase for cash, and carry on a small coffee or fruit farm, this affords a rare opportunity. Letters addressed to "Editor of the Planters' Monthly, P. O. Box No. 775, Honolulu," will receive prompt attention, with full particulars.

"Sugar producers increase on a large scale, but what about sugar eaters" asks a German correspondent. The French statistics for February give a queer answer to this question, inasmuch as they show that only upwards of 20,000 tons have been consumed in that country, as against 43,371 tons in February, 1897, and for the first two months in 1898, the French consumption amounted only to 45,796 tons, as against 78,066 tons a year ago. This is a very poor showing for a country like France, which is famous for her almost inexhaustible wealth. No doubt sugar is taxed much too high in France, but nevertheless it is not probable that this is the reason of this amazing decrease of consumption which is taking place, instead of an increase. The amount of the bounties added to the original tax tends to enhance the price of the commodity. However, the latter has been higher before, and the consumption did not sink to such a low figure.—Ex.

Expert knowledge for most of our rising industries has been provided, yet there is one industry which still cries aloud for help, and it is one even more deserving of assistance than some of those which have been attended to. Our coffee cultivators are groping woefully in the dark, as there is no industry which requires a more practical insight into its working than coffee. Up to the present our exponents have been too theoretical to guide new beginners, and until we can drop on the right person, we need not hope to receive a proper knowledge of the business. It strikes us we have had too many teachers from Ceylon, a country which has itself been struggling to master the many details which it is necessary to learn. Proper and suitable soil, climate, and other natural adjuncts have less to do with successful culture than have modes of culture, but far more than these is the method of curing, which will take into consideration every detail in con-
nection with climate, soil, moisture, ripening, curing for quality as well as for quantity, aroma, flavor, keeping qualities, and a host of other matters too numerous to mention. Only an expert versed in every detail should be engaged, but we have every confidence that such an one can be found.—Trop. Agriculturist.

A recent English authority on technical education, states that, when he made a tour of inspection in Germany fifteen years ago, technical schools were in excess of the demand by students, there being then accommodation for 6,000 students. The large Berlin technical school was then in course of construction. In a late statement the same writer says: "There are now, over 3,000 students at that one school alone; and further, a State-supported institute, mainly for scientific research, has been built. The institutions which existed fourteen years ago have nearly all been enlarged; some have been rebuilt. At Darmstadt, a city with half the population of Bolton (Eng.), there has arisen a palatial building, with separate institutions for the study of chemistry and electricity in their industrial applications, the whole of which has cost over $600,000. In Stuttgart new buildings have been erected for the chemical and physical laboratories, at a cost of about $400,000, to supplement the accommodation at the old school. For completeness of equipment and for excellence of arrangement they are superior to any in England. What the Germans have done to apply chemical science to industry, they are now endeavoring to do in the applications of electricity, and hence their large outlay on electro-technic laboratories, which they have good reason to believe will prove a productive expenditure."

Another competitor for public favor has proved itself this year under the name of coffea stenophylla, Don.—or hard leaved coffee. This coffee grows freely, but is not in any way so robust as Liberian, but has more of the character of growth of the Arabian, although it is decidedly distinct from the latter. Our trees four years old are some eight feet in height, and beautifully furnished with branches from the ground up-
wards. Though fruiting this year for the first time, it gives promise of becoming an abundant bearer, and its produce is of a quality to take its place at once upon the markets as a first-class coffee of the Mocha type of bean. The “cherry” is small and of a deep purple color when ripe, not red like the Arabian. The beans are small and roundish, less in size than the Arabian, but when in the parchment are clean and smooth like the seeds of that species, and the parchment is readily removed. The flavor of the coffee when roasted and ground is of a very high order. A fair crop of seed produced during 1897 has enabled the foregoing observations to be made, but a further series will of course be necessary before the question can be decided whether coffeea stenophylla will be a profitable crop to grow or not. All that can be said at present is that in growth, in crop, in quality, and in facility for preparation, it promises to prove a plant of the best class for cultivation in the West Indies.—Report of Supt. Trinidad Bot. Gardens.

A FORTY THOUSAND TONS SUGAR ESTATE.

The transfer of the ownership and control of the Hawaiian Commercial and Sugar Company’s plantation, better known as the Spreckels’ Plantation on East Maui, is one of the most noteworthy and largest deals in sugar plantation property that has ever taken place in Hawaii or perhaps elsewhere. This plantation was started by Col. Spreckels twenty years ago, on a scale far more ambitious than any previous venture of the kind in these islands. The extent of land covered by the deeds and leases, exceeds 30,000 acres, 25,000 of which are capable of producing five tons of sugar to the acre, provided water can be obtained for irrigation, as the land consists of rich alluvial and volcanic soil, such as is now being planted by the Oahu Sugar Company on this island. Colonel Spreckels once told the editor of this periodical that he hoped some day to see a crop of 40,000 tons of sugar taken off from it, and his early dream is still among the possibilities of the near future, to be accomplished by other parties.

For some reason not then known nor even suspected, there
had been for several months considerable activity in the shares of this estate, which, in consequence steadily increased in value, till latterly $34 have been paid to secure them. It seems that a combination of monied men of Hawaii and California, having full confidence in the original estimates of Col. Spreckels, and his plan to develop the largest sugar plantation in Hawaii, and having determined to secure the control of it, had been quietly purchasing all the shares offered by public or private sale, till over two-thirds of the issued stock had been secured, when a meeting of the shareholders was called, at which it developed that the control of the company's affairs had passed from the original owners, and a new directorate was called for and chosen, to the surprise of every one, including the former board, which gracefully surrendered to the inevitable. The old board was practically controlled by Rudolph and C. A. Spreckels, while their successors are residents of Hawaii and California.

The capabilities of this fine estate are almost unlimited, and under the new directorate, with abundant resources to develop the now latent artesian water supply, which is believed to be practically inexhaustible, it is among the possibilities of the near future that the ambition of Col. Spreckels to turn out 40,000 tons of sugar annually, may yet be accomplished by his successors.

NOTES OF A VISIT TO LOWER CALIFORNIA.

There is much to interest strangers in visiting Southern California, in observing how an arid waste may be changed by intelligent labor to fruitful fields, vineyards and orchards. In the early fifties, Horace Greeley, then editor of the New York Tribune, made a flying trip through this portion of the State, and seeing on every side vast areas covered with drifting sand, with scarcely any vegetation but sage grass, cactus and scrub trees, declared that neither hay nor grains could ever be profitably grown there, nor even fruits, such as were produced in the older sections of the Union. Yet Mr. Greeley lived to report in his own paper, that California wheat and other grains fall-planted and matured during the winter rains,
were not surpassed in quality or yield per acre by any grown at the East, or in any other country. It was the sterile and uninviting aspect of the country seen in his visit that deceived him, and led him to express an opinion in which no doubt thousands of superficial observers have coincided. And yet, these same apparently-worthless lands, when supplied with water from the autumn rains or from the numerous artesian wells which are now flowing in every direction, have yielded abundant harvests, that have in more than one instance furnished a reserve supply, which has checked the reign of famine prices that would otherwise have prevailed in eastern American or European markets.

In nearly all parts of Southern California fruit trees of all kinds require to be irrigated in order to mature their crops. Many an orchard has been abandoned, on account of being located in a dry section, where irrigation is not available. During our recent visit there, we witnessed the cutting down of fine orchards of prune trees, because no irrigation water was available to mature good, marketable fruit. The trees grew well, and to all appearances had just the soil and climate required by them. On some trees, the limbs were loaded with fruit, which bent them to the ground; yet there was little or no meat in the fruit—merely stones and skins. Prunes to be merchantable require to have a good supply of pulp or meat. These were almost wholly skins and stones, rendering them when dried unmarketable, and therefore worthless. The same may be said of walnuts, olives, almonds, apples, etc. They need rain or water at the season of ripening and if not obtainable they are very inferior in quality and market value.

Oranges have been become a staple product of Southern California, and the trees bear well, when regularly irrigated. It is said that the crop of last year, had it all been good, would have filled twelve thousand cars, each taking 250 boxes of oranges, making a total of three millions of boxes. Unfortunately the frost came, and injured a part of the fruit, rendering it unmarketable in the Eastern markets. This caused a very heavy loss to the growers—not only a loss of fruit, but of the railway charges for freight and other expenses, when shipped to Eastern markets. These frosts, coming as they
do every few years, render orange growing in California a hazardous business. The thermometer fell last year to 28° Far., and in one night damaged the crop to the extent of over one million dollars. The only way to ascertain the extent of the injury from frost, is to cut the orange open. Outwardly the fruit appears, when gathered and boxed, all alike; but when kept a short time, or when shipped to the Eastern markets, the oranges change in appearance and experts can readily pick out the frost-bitten fruit, which no dealer cares to handle, as a few such oranges in it will condemn the whole box. Thus, it will be seen, that orange growing in California has its risks, which, though coming seldom, come suddenly, and no amount of precaution can determine when to prepare for or guard against them. In this respect, California and Florida are similarly situated.

Other fruits, such as apples, pears, peaches, plums, grapes, etc., have not been so abundant this year, nor so fine in flavor and appearance as in former years, yet the price in the San Francisco market is about the same—apples, for instance, the choicest can be had in quantities at from sixty to seventy cents per box for the best varieties. It is pleasant to observe the care bestowed on the orchards of every kind of fruit. They are kept free from weeds, and the rows are made very straight, giving the whole the appearance of order and system.

In riding through the State, very few Chinamen were seen either in the towns or the country. And yet we were informed that a considerable part of the manual labor in the fields is performed by them, and that they are found to be valuable and trusty, when they become domiciled in any locality. If so, the prejudice against them must gradually wear off, and they will become a necessary factor in solving the labor question in rural districts.

One very pleasant feature in the settlement of Southern California is the colony system which has been adopted by many. Colonies of families located in sections of the United States decide to migrate to California, and for this purpose send one or more agents to decide on the location and to purchase land sufficient for their wants. Thus the nucleus of a village is started, lands purchased according to the ability
of each family, forming a neighborhood of old friends, all interested in the success of each other. If water is needed for irrigation, a company is formed to provide it, the stream being often brought many miles, and the water farmed out as wanted by the colonists or by strangers coming in among them. This is one of the most interesting features of life in Southern California, and one which might be adopted here in our islands, though we do not possess so large or so favorable a sphere for it as is found in California.

BEET SUGAR IN AMERICA.

During a recent trip to Southern California, we had the pleasure of visiting the world-renowned beet factory of Chino, which was started some ten or twelve years ago by Richard Gird. Our visit was made in company with Mr. Geo. H. Dole, formerly manager of the Kapaa Sugar Plantation of Kauai, who is now residing at Riverside. This section of the State, which may be termed the garden of Southern California, is now supplied with a net-work of railroads, needed not only for travel, but for the constantly increasing demands of freight. It is not permitted to every stranger to inspect the interior working of the new beet sugar factories, as many devices and improvements are used in them, which are original ideas of the proprietors, or introduced by them first as experiments, and were not patented until their utility had been proven beyond a doubt.

The Chino factory is located in Southern California, not far from Los Angeles, Pomona, Riverside and other flourishing towns of that vicinity, with which our readers are familiar. It is a stone building and the entire work is done under one roof. The beets are of the variety known as Klein Wanzleben, an improved white German beet, considered as one of the richest in saccharine juice and most profitable for making beet sugar. The beets are brought to the factory in trains of steam cars, and the haul is not unfrequently from ten to twenty miles. They are not raised by the factory owners, but by farmers, who receive usually four dollars per ton, under contracts made with the factory company. After being
thoroughly washed, in a trough adapted to this purpose, the beets are weighed, and then passed to the cutting machine, which cuts them into round strips, resembling pipe stems, six to eight inches long. In most factories they are sliced, each method having its advocates. They then go into the diffusion battery, where they receive the same treatment, as cane does in the same process. Each factory has its special methods of working the details, but they vary little from the usual formula.

The centrifugals in this factory are the latest improved pattern made by the Weston Centrifugal Co. of Boston, and larger and more easily handled, and do their work more rapidly. No accident has ever been reported from their use. Some parts of the machinery in the Chino factory are entirely new, having been designed expressly to save labor and to expedite the work. With such improvements as have been introduced, the cost of making sugar has been reduced below two cents per pound, and the profits of the factory largely increased. The cane sugar factories must adopt similar labor-saving methods in the mill if they would keep abreast of beet sugar, in the sharp rivalry in which they are engaged.

The drought which has prevailed in America, west of the Mississippi, has affected the beets, and consequently the amount of beet sugar will be less,—in some sections one-third less. But the past season has been quite unusual, and will not check the steady expansion and growth of the beet industry in America.

In this connection the following article from the Leipsic Tageblatt, possesses interest:

"American journals announce that the beet sugar craze prevails throughout the counties of northern and middle Indiana to a degree that recalls to mind the cooperative creamery and milk station fever which raged there several years ago. Numerous and largely attended meetings of farmers and capitalists have been held to discuss and agree upon plans for mutual operation. The former are to raise beets; the latter are to manufacture them into sugar. So great is the ex-
citement, that many already cherish the dream of seeing Indiana become the center of the American beet sugar industry.

"Last spring, well-chosen and prepared beet fields in many localities were planted with beets of the finest quality, which the Department of Agriculture had obtained from Europe and distributed free of cost to the farmers. In the autumn the agricultural experiment station undertook the task of carefully testing the beets which had been so produced. In Stark County, three-eighths of an acre yielded grown and topped beets at the rate of 14 tons to the acre. A beet 12.6 ounces in weight was analyzed at the experiment station and yielded 22.9 per cent. of sugar, with a coefficient of 8.45. This specimen was grown from seed derived from Klein Wanzleben (a commune near Magdeburg, in Prussian Saxony). In the same way, several hundred specimen beets from different sections of the State were analyzed, and all gave promise of yielding not less than 12.6 per cent. of sugar from juice of 80° purity. Many specimens exceeded this yield by from 2 to 8 per cent.

"What is here related of Indiana, is also true of other States, particularly California, which is especially adapted to sugar beet culture. America imports yearly 2,000,000 tons of sugar, valued at 400,000,000 marks ($95,200,000), from foreign countries, especially from Germany, and has for years been considering ways and means to supply this demand with home-grown sugar. Such a result cannot be reached in a day, but the Secretary of Agriculture has for years aided and encouraged beet cultivation by all possible means. At present, they are stimulated and encouraged in such efforts, which have so serious a meaning for us, by the foolish action of the German Agricultural Bund, which has inspired the unheard-of measures against the importation to this country of American agricultural products, and has had the audacity to condemn American meats as unwholesome, thereby greatly embittering the feelings of American farmers against Germany.

"The latter now rush with redoubled fervor into sugar beet cultivation in order to supplant entirely the use of German sugar. The bund of German agriculturists may be actuated by the best intentions to aid and protect its members, but
blind zeal only injures whom it would help, and is in this case wholly out of place. America imports from Germany constantly sugar, hides, skins, wool, flax, hemp, and manufactures of such materials, as well as seeds, potato starch, etc., which are in fact agricultural products; and it is simply insanity to want to slap such a customer in the face.”—Am. Consular Report.

THE OUTLOOK FOR COFFEE.

The leading trade papers make frequent references to a considerable falling off in the Brazil coffee crop. The following is an extract from New York papers of recent date: “The great variation in the coffee crop of Brazil shows that a continuation of mammoth crops is not to be expected, unless due to a very extensive increase in the number of trees coming into bearing from year to year, which is the case in Brazil. Now it seems possible that, for lack of foresight on the part of the planter, the old coffee plantations are threatened with decay, and that means chronic disease and an easy prey to insect pests.”

This from a London paper: “The world’s visible supply on the 1st of July, 1898, is estimated to have been 5,436,000 bags, equal to a half-year’s consumption. It is perhaps too early to figure on the Brazil crop for the current crop year, but the statisticians are in the field with their estimates. These differ considerably, as might be expected. There is also a considerable variation between what is called the official and the commercial estimate, as will be seen by the annexed comparison:

<table>
<thead>
<tr>
<th></th>
<th>Brazil—Official</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2,500,000</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Rio, bags</td>
<td>4,500,000</td>
<td>6,000,000</td>
</tr>
<tr>
<td></td>
<td>7,000,000</td>
<td>9,000,000</td>
</tr>
</tbody>
</table>

Admitting that the largest total is the nearest correct, there is a shortage of over 1,500,000 bags as against the reported crop for the last crop year. As Brazil is the chief source of supply of coffee, these statistics are entitled to some consideration on the part of the grocery trade.”
THE AMERICAN SUGAR AND COFFEE TRADE.

The New York market is beginning to feel the effect of the rivalry of the two new sugar refineries, known as the “Arbuckle” and the “Doscher,” which are said to have been erected to combat the monopoly of the American market by the Sugar Trust. The latter, however, has a large reserve fund, said to be thirty millions of dollars with which it will enter the contest, if compelled to do so to retain its place. Authority was given by the shareholders, at the last annual meeting, to use this fund, as the directors might deem best, and if they cannot buy out their new rivals, they may be able to control them in some other way. The Trust has held its own for the past ten years, and may still be able to do it, but it will only surrender after a desperate struggle. The Arbuckles have long been in the coffee business, supplying a large portion of the American trade, with both ground and unground coffee, in which business they have amassed a large fortune. They originated the system of putting up ground coffee in patent paper bags of two, five, ten and twenty pounds each, which have proved immensely popular with the retail trade. Their sugars will be put up in the same manner, and will doubtless become as popular with the trade. Of course, all who are interested in sugar and coffee, as most of our readers are, will watch the progress of these millionaire titans in their efforts to reduce the price of these articles and to control the immense market of (we may say) the whole North American Continent, embracing not less than eighty millions of people, all of whom use one or both as articles of food, and are always glad to see a reduction in the retail price of either.

WALL STREET AND AMERICAN SUGAR TRUST STOCK.

We print below an interview with our Mr. Wallace P. Willett, which was published in the New York Times:

“So far as the sugar trade itself is concerned, there has nothing occurred to disturb the even tenor of its way, and all the refiners have been making money—probably they have been making considerably more than the amount applied for
dividends. The completion of the Arbuckle refinery has made no change thus far in the actual situation, and, were it not for the rumors which come from Upper Wall Street—where the professional Stock Exchange speculators are—we would know little or nothing of the fight which is supposed to be in progress. For once, Upper Wall Street appears to be running the refined sugar business of the country. It has discovered that there is now, or is to be, a great trade war, and it is going to help make it real.

"By the fall in Sugar Trust stock and the promulgation of the cause of it all over the country, Upper Wall Street has put in the entering wedge for an actual war. Every buyer of refined sugar is frightened, and the trade from being excessively heavy while sugar stock was 140, is running down to almost nothing, with the stock at 117. The country is alarmed, and will sell its last barrel of sugar before buying more. Wall Street will keep them in the same state of alarm, refined sugars will decline on a small demand, and refiners must work harder to keep their share of the trade.

"The fair value of Sugar Trust stock looked at as industrial, subject to the fluctuating conditions of the raw sugar supplies, tariff legislation, and legislative investigations, is probably 110 to 115. From this normal value the manipulator by adroit use of his stock in trade, and in connection with newspapers and news agencies, can work the price up 30 points or down 30 points. When the manipulation is upward from 115, very few of the interests of Lower Wall Street—the headquarters of the sugar refiners—take much interest in it, but leave it to Upper Wall Street to run. When the manipulation is downward from 115, Lower Wall Street men, who know the value of the property and what it is earning, buy it and put it away to sell when the manipulator gets it 30 points above normal. The manipulator now thinks he has a good chance for his downward movement, and may succeed for the reasons given above.

"When the manipulation was upward from 115 to 150, attention was called to the fact that the rise was without adequate foundation. But that did not stop the rise. If it is said that the downward movement from 115 is due to manipulation,
and has no adequate foundation, even admitting a trade war, it would be foolish to say that the manipulators will not succeed, after what they have accomplished in the other direction. Looking ahead, however, beyond the downward manipulation, we think we can see that the next upward manipulation may carry the stock higher than ever before. The argument for the rise will be free raw sugar from Puerto Rico and from Cuba, and a largely increased consumption resulting therefrom, which will make a place for the Doschers and the Arbuckles in supplying the increased consumption.

“The average increase of consumption for ten years in the United States is between 5 and 6 per cent. per annum. For the last two years there has been a decrease in the consumption for special reasons. Therefore, either next year or the following year there should be a sudden increase of 10 or 15 per cent. in one year, which, of course, would make room for the new refineries without disturbing the full percentage of business for the American Sugar Refining Company.

“But this is far ahead. The Harrison-American fight must be repeated first. It took six months of great loss to all refineries to bring Philadelphia refineries into line, and more obstinate men than Harrison are in the Arbuckle-Doscher refineries. The American Sugar Refining Company is never likely to absorb these refineries, but the final outcome may be expected to be a working arrangement giving the American Sugar Refining Company its full proportion of the production, such as recently came to an end between the American Sugar Refining Company and the Mollenhauer, National, and others.

“The rumors that the outside refineries are to form a corporation in opposition to the American sugar Refining Company or that they have secured the services of American Sugar Refining Company employees are too absurd to require comment.”—Willett & Gray’s Statistical.

The first generous shower of the season, for this section of Oahu, Mani and Molokai, came on Sunday afternoon, Oct. 23, when about one-half of an inch of water fell. From now on, for four months or more, our crops will probably receive all the rain needed—and perhaps a surplus of moisture.
You must not expect that I come before you today with any revolutionary invention, like the world-famed "Electric Sugar," or with a bombastic advertisement of some discovery of my own, which will revolutionize the sugar making and sugar refining of the whole world.

The object of this paper is to bring before your notice several processes connected with the great industry of sugar refining, which have been investigated, studied, and worked both experimentally and on a large scale during the past year; and if all the promises made by them are fulfilled, they will effect a great change in the present method of working and refining sugar.

As you know, the sugar question is one of the questions of the day. It is now virtually an international question, and one of great importance from the standpoint of political economy.

We especially in this country, I mean we sugar refiners, look to Parliament to say a decisive word, and to help the most distressed of all industries; we ask of our representatives nothing less than to give us the right to which we are entitled, the right to the markets of our own country, un-molested by the protection which foreign States extend to our competitors.

The principle of this country is Free Trade, and we want no more than this, and only ask that this gross attack on Free Trade may be repelled, and ourselves put on the same level in our own market as the foreign producer.

Should the International Conference, which is to be held shortly at Brussels, result in failure, like its predecessors, and the British delegates return to London and report the failure of this conference, and our Ministers and parliamentary representatives hear the announcement quietly and un-moved, then there is an end to English sugar refining.
These words will be forgotten, but our children will be told that the oldest sugar refining industry in the world was in days gone by in England, and that there were at one time over one hundred sugar refineries in Great Britain, which dropped down to thirty, to twenty, to eleven, and from this, through the apathy and passiveness of our representatives and the people, they at last ceased to exist altogether, and will never again be resuscitated.

Should justice be done to British refiners, then our industry will again be great; meantime your Society has kindly allowed a paper to be read before you about sugar refining.

Sugar refining consists of four essential processes:—

1. The solution of the raw sugar to facilitate subsequent filtration.
2. Filtration to get rid, in the first place, of the mechanical impurities and afterwards of the coloring matter.
3. Crystallization.
4. The separation of the newly formed crystals from the mother liquor, and drying.

A great deal of attention has recently been paid to the decoloration of sugar liquor, which had hitherto been accomplished mainly by the use of animal charcoal, an English invention.

Animal Charcoal.—Animal charcoal is nowadays principally used for decoloring dark colored sugar solutions.

It is the aim of all chemists and scientists connected with the sugar industry to dispense with the use of animal charcoal for three reasons:—

1. The cost of the plant and installation.
2. The high cost of working.
3. The loss which the sugar in solution suffers in passing through this decoloring medium.

The disuse of charcoal can only be brought about by the liquor being treated in some other way by which the colored matter is removed.

You are aware that the coloring matter of raw sugar is partly due to the chromogene of the beetroot, sugar cane, or other plant material from which sugar is obtained. Another
source is the inversion of the saccharose, and also the carame-
elization of the sugar through the action of heat. The carame-
lar color is the worst, as it is the most difficult to destroy.
The new processes which I shall describe are chiefly directed
towards the removal of these coloring matters.

I will describe in brief the operations connected with sugar
refining. The raw sugar is dissolved in water at a tempera-
ture of from 180° to 212° Fahr., so that the density is about
27° Beame. This sugar solution passes through filter
presses, and the liquor from the filters is sent through animal
charcoal, or treated by some of the recently invented pro-
cesses for the removal of coloring matter. The clear liquor
is evaporated in a vacuum pan to crystallizing point, and
dried in the form of granulated sugar, cubes, crystals, &c.

In former times it was the general thing for the refining
to last from three to four days, but you can now see the finest
crystals made from the roots in 18 hours.

The new processes start either at the point where the
sugar is dissolved, that is, in the melting pan, or at a later
stage in a specially constructed vessel, or in the filter press
itself.

In dealing with new processes I will only criticise and bring
before your notice the most noteworthy, ignoring some hun-
dreds of patents which have been taken out during the last
three years and which serve to keep the Registrars and the
Patent Office busy rather than sugar experts and sugar manu-
facturers. I have often thought that a large amount of the
fees paid by generous inventors might very well be utilized
in helping the distressed sugar industry, this would give the
would-be inventor the satisfaction of knowing that he has
done something for that industry.

1. The Manoury Process.—The Manoury process has for
its object the obtaining of all extractable sugar in one opera-
tion, the result being white sugar and molasses.

As usual, the operation commences with liquor at 25 de-
grees Beame. When the vacuum pan is filled to about two-
thirds, the supply of this liquor is stopped and the masse-
cuite (semi-crystalline mass) is fed with the richer syrup from the centrifugal, which is obtained as mentioned below.

This feeding continues until the reserve of the richer syrup has been completely exhausted. The operation is not complete at this point, and the feeding of the masse-cuite is continued with poorer syrup or molasses, such as is obtained from the centrifugals, heated to 60° C.; the feeding stops when the pan is full. The boiling of the masse-cuite continues until only 6% of water is left, when it is run out into the mixers.

Before going further it may be as well to observe that with this proportion of water (6%) the masse-cuite is very fluid, its fluidity may indeed be compared with that of a masse-cuite obtained from refined sugar. On the other hand, the masse-cuite is not more highly colored than if no addition of syrup had been made to it. This is due to the fact that the poorer syrup, the composition of which is that of ordinary molasses, has not been subjected to a high temperature in the pan, as it would have been in the process of making; this is a considerable advantage.

At the end of the operation there is in the vacuum pan a semi-fluid mass composed of white sugar crystals originating from the liquor first used and increased in size by crystallization from the liquor added from the centrifugal machines, and of a mother-liquor containing but little sugar, and usually identical in composition with ordinary exhausted molasses.

The proportions of syrup and centrifugal liquor used are determined by the chemist according to the character of the masse-cuite of a previous operation and from his analysis of the centrifugal liquor.

To prevent the partial solution of the crystals whilst being freed from the mother-liquor in the centrifugal machine, the Manoury process proceeds with the masse-cuite as follows:—

It is run out of the vacuum pan into an open mixer made of sheet iron, provided with a stirrer and with a jacket permitting of the free circulation of cold water. As soon as run into the mixer a poor syrup of 35° Beaume is added and the temperature quickly brought to that of the atmosphere, the
valves are then opened and the masse-cuite transferred to the centrifugals.

The syrup running from the centrifugals is collected in two portions, the first contains very little sugar and is pumped into a tank above the vacuum pan to be used for liquifying the next masse-cuite; the second, obtained during the operation of washing in the centrifugals with steam or water, contains small sugar crystals and is carried back into the vacuum pan to increase the size of the crystals in liquor there. When the process has been carried so far that the first runnings from the centrifugal are incapable of yielding more crystals, these are set apart as molasses.

The plant is very simple. Near the vacuum pan are two tanks, one for the richer and the other for the poorer syrup. Under the pan are two mixers with outlets to the centrifugal machines. Two more sluices are also required for separating the two kinds of syrup.

The sugar obtained is a White No. 3, French standard. The problem of the extraction of white sugar in a single operation and obtaining perfectly exhausted molasses is therefore solved by the Manoury process.

The advantages of this process are claimed to be as follows:—

1. Great economy of animal charcoal, as there is no after-product to bleach, the products obtained being white sugar and molasses only.
2. A far greater yield of white sugar owing to the shorter time the liquor is being heated, producing less caramel.
3. Immediate production of a marketable article, as all the after-products which look up a considerable capital for a long time are avoided.
4. Large saving in fuel and labor.
5. In the case of cane sugar refining the above advantages are still further increased by the comparatively colorless molasses obtained in this process.

Finally, the entire absence of the bad smell and taste usually accompanying molasses.

2. The Soxhlet Process.—This process has for its object
the entire replacement of charcoal in sugar refineries, and
uses as a filtering medium fossil meal and prepared wood-
pulp, which forms on the cloth in the filter-press a filtering
bed that retains the impurities, especially the viscous and
gummy matters, and yields a very fluid syrup.

The inventor claims that his masse-cuite is dry, the evapora-
tion and crystallization quicker, and the sugar very bright.

The effect of the filtering is noticeable in the boiling of
the first product, and even more so in the after-products. The
crystallization is quicker and the grain is better formed, the
spinning in the centrifugals easier, and the sugar less colored.
The reason of the last result is not sufficiently explained, be-
due it cannot be said that the fossil meal of Soxhlet pos-
sesses a decoloring power equal to that of animal charcoal,
but still dark sugars after passing through this process very
often look like first products.

Soxhlet’s process is best applied to a thick liquor, and if an
increase in expense is feared it is necessary that the syrups
running off from the first product should be treated by this
process before they go to the crystallizers.

The cost is very reasonable, and the installation very sim-
ple. For a small works only two mixtures with a stirring
arrangement and a small pump and a filter press are re-
quired. To work up daily 100 tons of beet roots 12 square
metres of filtering surface are necessary.

Several works have already adopted this process and they
calculate that the cost per day only amounts to £1 sterling.
and several factories have substituted Soxhlet’s filtering
medium for animal charcoal.

3. THE “RANSON” PROCESS.—Of all the new processes which
have lately seen the light and which have for their object the
doing away with animal charcoal and refining sugar at the
lowest possible cost the “Ranson” process is the best known.

It has been brought prominently before the sugar refining
world by the numerous patents that have been taken out and
also by the formation of an English “Ranson” syndicate with
a capital of £600,000.

The “Ranson” process is the one which has been the most
spoken about and criticised.
First of all, what is the Ranson process? According to the English "Ranson" Patent, Number 19,815, of 8th September, 1896:

The syrup or the sugar solution which is to be refined is made slightly alkaline with barium hydrate or carbonate of soda, and afterwards hydrogen peroxide is added in the proportion of one-third to five litres per 100 kilos. of sugar, according to the color of the syrup. Decolorization is said to be effected gradually.

Later on 100 grammes of finely-powdered animal charcoal, from which all the phosphate has been removed by acid, are added for every 100 kilos. of sugar. The object of this addition is said to be the liberation of oxygen from the hydrogen peroxide so that the organic compounds capable of being decolorized may be oxidized.

The excess of oxygen is removed from the syrup by adding hydro-sulphites of aluminium, barium, &c., or a solution of hydro-sulphurous acid, or by producing this acid in a nascent state in the syrup.

To prepare the hydro-sulphites of aluminium or barium, a corresponding bi-sulphite is placed in hermetically closed vessels, at the bottom of which is powdered zinc.

A solution of hydro-sulphurous acid may be made by adding 20 grammes of zinc powder to a solution of sulphurous acid containing 100 to 200 grammes of acid per litre.

The two processes of oxidation and reduction leave in the juice an excess of sulphite, which is converted into sulphate by adding the necessary quantity of hydrogen peroxide. The temperature of the mixture is raised to 78° C. and the syrup filtered. By this the heated solution is freed from the precipitates and the excess of sulphurous acid driven off.

The solution becomes alkaline and any inversion is prevented. If the sugar is refined by the reducing process the liquor is charged at a temperature below 50° C. with sulphurous acid. The organic matter is decomposed and the salts of the alkalies converted into sulphites, which latter are oxidized to sulphates by the treatment with peroxide of hydrogen.
The syrup is filtered and again saturated with sulphurous acid and then 10 to 50 grammes of powdered zinc are added to every litre of syrup and the whole mixed for fifteen to twenty minutes. Hydro-sulphurous acid is produced, which effects the decolorization very expeditiously. The temperature is raised to 75° C. before filtering, because at this temperature the hydro-sulphurous acid exerts a more energetic reducing effect. At this stage peroxide of hydrogen is used in the same way as in the oxidizing process.

In the Bulletin de l'Association des Chimistes, 1897, No. 14, the Ranson process is somewhat differently described as follows:

By the Ranson process very white and pure sugar solutions are obtained. The masse-cuite is perfectly white, and by a special mechanical arrangement is brought into the form of fine sugar slabs, which are afterwards cut into cubes. The merit of the whole process is that white sugar can be manufactured in 48 hours.

In adopting the oxidizing treatment, that is to say where peroxide of hydrogen is used, the liquor is first made alkaline by baryta or with carbonate soda. The hydrogen peroxide is then added and decolorization effected by keeping the mixture for two hours at a temperature of 40° to 50° C. It is necessary to have an excess of peroxide of hydrogen so as to obtain as complete a decolorization as possible. The excess must afterwards be removed as the liquor would otherwise again become colored. This excess is removed by hydro-sulphurous acid, which at the same time further decolorises the syrup.

Afterwards barium or aluminium hyposulphite is added, or even the acid itself in a free state. If the latter is done it is produced by chemical reaction in the liquor itself. By operating in this way certain coloring matters are destroyed by oxidation, while others are destroyed by reduction. The excess of hydro-sulphurous acid is removed by a further addition of peroxide of hydrogen in quantity determined by experiment. The liquor is finally heated to 75° C. and filtered.

This process may also be carried out by commencing with the reducing treatment and finishing with oxidation.
According to this article the necessary plant is very simple indeed, and consists of tanks furnished with stirrers and mechanical filters. The treatment is simple and easily controlled.

The process has been altered many times since its birth, and has caused many debates at the meetings of Sugar Associations in Germany, Austria, and France, at which it has been very adversely criticised.

I will only give the pros and cons of these discussions, and must leave it to you to decide what is the real value of this process.

At the meeting of the Association of French Chemists, held 10th January, 1898, Prof. Vivien gave some information about Ranson’s process as conducted in the last campaign. In the published report of the meeting (Bulletin de l’Association des Chimistes, 1898, page 882.) a letter from Mr. Buisson appears. Mr. Buisson is a great authority on sugar refining, and he said (according to the Journal des Fabricants de Sucre, 16th March, 1898,) that if Ranson’s process is conducted as described the crystallization of the sugar takes place in presence of salts of zinc, that as the organic acids disappear in the boiling, the masse-cuite becomes alkaline.

“Mr. Vivien himself stated that the alkalinity comes back again in the boiling pan, the organic acids having disappeared. This means that the salts of zinc will not remain in solution, but that the alkali which has been formed in the boiling pan will act upon them and will precipitate oxide of zinc. The oxide of zinc will separate with the sugar, which will of necessity retain it.

“The oxide of zinc is of itself not dangerous until in contact with the acids of the stomach, or such acids as are often found mixed with sugar in different edibles. It would then exert a poisonous action.

“The sugar produced by the ‘Ranson Process’ is, according to Mr. Vivien, an extra white sugar, and will not be sent to the refinery, but will be delivered straight to the consumer.

“The question will thus arise whether the product is not
“dangerous to health on account of the possible presence of zinc.”

The President of the Association afterwards stated:—“That it is against the French law to use poisonous substances in the manufacture of edibles.”

Mr. Dupont stated—“That in Hungary it was strictly forbidden to use poisonous materials in sugar works.”

Dr. Claassen, one of the greatest authorities in Germany on refining, stated, with reference to the Ranson process, in the Centralblatt fuer die Zucker-Industrie der Welt, 24th April, 1897, as follows:—

“I found that it was necessary to accept the report of Degener with great caution, and it is quite out of the question that any sugar works will adopt the Ranson process. Several of them may take an interest in the process, and that is the reason why I show them the reverse side of the medal. I must say that I am against all the attempts lately made to bring complicated and very dangerous clarifying methods into refining, that I consider the simplest process is the best, and that I believe the use of lime will weather all storms. If it is necessary to have new purifying agents, why not apply them to molasses, and extract the sucrose from them.”

A discussion took place on the Ranson process, and in this Dr. Claassen writes further in the Centralblatt fuer die Zucker-Industrie der Welt of the 19th of February, 1898:—

“The Ranson process is nothing more than the old well-known sulphurous acid process of Dr. Seyferth of the years 1869-70, which created a great sensation at the time of its publication.”

Claassen describes the exact wording of the Seyferth process, and said that the Zeitschrift der Deutschen Zuckerindustrie for the year 1870 contains the reports of several speeches by noted sugar manufacturers on the Seyferth process.

This process was very soon abandoned, and a speaker at the general meeting of German Sugar Association in the year 1870, said that:—“Permanent success was not attained by this
Dr. Claassen, in the Centralblatt der Zucker-Industrie der Welt, of the 5th March, 1898, said as follows:

"The similarity to the Seyferth process is very marked, and proves that treating the thick liquor with sulphurous acid and treating the thin liquor with sulphurous acid in a vacuum pan are one and the same process. Seyferth treated the liquors with acid as well, though he was very cautious in doing so, and advised manufacturers to carefully avoid using an excess because he found they added too much, causing the liquor to become strongly acid."

Dr. Claassen abstained from further criticism because he was afraid that if he went "further and properly into the matter his criticism would be too strong."

He said "that the statements of the inventor respecting "getting greater yield and less viscosity were not proved, and..."
“the more the Ranson process is written about and debated on, the more the foundation of it becomes destroyed and "more stones fall from this strange structure, and the ruin "which finally remains is from the standpoint of the Patent "law practically useless.”

Dr. Hoepke, in the Deutsche Zucker-Industrie of the 11th March, 1898, stated that the use of sulphurous acid in an acid liquor without bringing about inversion is not new, and that he himself and other investigators had experimented and published articles on this point in the preceding year.

With reference to the Ranson process, C. Huck said, in the Centralblatt fuer die Zucker Industrie der Welt of the 9th May, 1896, that this process is not so simple as it looks, because first of all there is the difficulty connected with the use of baryta which prevents its general use, and further the cost as well as the danger of working.

According to the Deutsche Zucker-Industrie of the 7th April, 1898, and the Journal des Fabricants de Sucre of the 6th April, 1898, at the general meeting of the French Sugar Chemists’ Association, held 31st March to 2nd April, 1898. Francois Sachs, the leading Belgian chemist, said in a debate on the Ranson process:

“That the inventor should have proved that an improvement of the liquors takes place or that the molasses have a “very low co-efficient of purity and a low salt co-efficient.” Sachs said “that according to Gouthiere, chemist for the “Ranson process, no noticeable improvement of the salt co-“efficient was found. Also, according to Flipo, manager of “the Crepy-en-Laonnois Sugar Factory, the salt co-efficient “of the molasses was 4, which is normal. Therefore the higher “yield of sugar was not proved.”

The two most distinguished sugar chemists of France, Manoury and Weissberg, spoke against the Ranson process at the same meeting.

The former asked in vain for an explanation of the extraordinary disproportion between the yield of refined sugar and molasses.

Francois Sachs and Weissberg said that the improvement is not due to the higher co-efficient but to the smaller viscosity
of the liquors which vary with the nature of the syrup. Weissberg denied the possibility of the process being an improvement, and according to the results obtained in Russia, he would rather suggest that the process gives a less yield, and that the result of obtaining molasses of 50% is an impossibility. The discussion closed with the declaration of Vieville, “that he obtained by sulphauring green liquors and syrups the same results as Ranson with his process.”


The new process is to work according to the equation:—

$$Zn + 2KOH = ZnO_2K_2 + 2H$$

This hydrogen is to work in its nascent state on the coloring matters of the sugar. $K_2O_2Zn$ is to act on the organic matters, and so form insoluble zinc compounds.

The Centralblatt fuer die Zucker Industrie der Welt of 8th April, 1898, remarks:—“How the objectionable alkalies are “to be eliminated in this process remains a mystery.”

Poisons in Sugar Works.—Many patents have been taken out, and many inventions and processes have come into the market, the principal agents in which are chemicals of a very poisonous character, such as the baryta, zinc and lead processes. Of all these I consider the zinc and lead salts as the most poisonous. You know very well what a small quantity of lead is sufficient to produce a poisonous effect. Percentages of lead in the third decimal place may be very harmful and may produce fatal results.

However high the opinion we might form of these processes, it would, I should think, be counteracted by the fear of a conflict with the health authorities. Everyone who has managed works in which poisons are used, and who has to rely upon men and foremen, must agree with me that there is always a fear of great damage being done by some slight mistake causing the introduction of poison into one or other product.

My view is the same as that taken by many sanitary authorities of Europe and America, that poisonous agents should not be used in factories preparing edibles.
4. THE GROSSE PROCESS.—This process, which is not yet well known, is based on the rational boiling to grain of the by-products, which is achieved by using specially constructed vacuum pans in which the material is treated for 48 to 60 hours. From this apparatus the material may, after cooling, be at once transferred to centrifugal machines, and thus the entire after work connected with running into tanks, and of course also the expense and uncleanliness connected therewith, are avoided.

On account of this rapid production of sugar crystals there is no danger of inversion and fermentation, and the loss of sugar caused thereby is avoided. A marketable product is thus obtained within two or three days, whereas by the old system of refining it took over a fortnight or more. Apart from this the old system was dearer owing to the lengthy treatment and the loss of interest on the capital during this period. Refiners’ by-products, having a quotient under 80, could be treated according to this process.

For this treatment only two “Grosse” apparatus, containing about three and a half tons of masse-cuite, are required, and all available sugar is said to be got within two days.

5. THE BAKER PROCESS.—The sugar refining process known as Baker’s employs superheated steam of low pressure to purify the sugar in the centrifugal machines. The temperature of the superheated steam should be such as to allow of condensation taking place to an extent sufficient for removing the syrup that adheres to the sugar crystals while the temperature is quite high enough to prevent continued condensation. It is evident that when the crystals acquire the temperature of the steam no more water will be produced by condensation and continued solution of the sugar will not take place during the centrifugalling.

In practice, superheated steam of about 180° C. is used, whereby the sugar becomes heated to 96° C. It has been found that there is not the slightest decomposition or damage produced by using superheated steam having a pressure of about .3 atmosphere and a temperature of 100° C.

The expenses of installation and of management are insignificant and it only needs a stove with cast iron retorts
to superheat the steam. One half-ton of the lowest dysodile is sufficient to heat a stove for a day with an output of white sugar of from 25 to 40 tons.

The steam coming from the boilers passes through a reducing valve, enters into the retorts and circulates in the opposite direction through pipes heated by the flue gases. The temperature is regulated by a valve which permits steam being taken from the hotter or the cooler retorts.

For a centrifugal machine a pipe is arranged which is enclosed in another pipe, and superheated steam comes from the mantle between the two pipes, enters the interior of the pipe, and is led to the centrifugal machine by a regulating valve. It is of the greatest importance that all the pipes and the centrifugal machine should be insulated in the best manner.

This improved method of refining sugar can also be advantageously combined with the process of blueing. After the sugar has been suitably whitened with superheated steam, the blue is mixed with water or syrup and is carried by steam or compressed air against the layer of sugar. The sugar coming from the centrifugal machines may, after passing the sieve, be packed in bags, as it is perfectly dry and has a polarization of 99.6 to 99.8.

6. The Ozone Process of Verley.—According to this process sugar liquor is treated with ozone for the purpose of bleaching it. Ozone acts on sugar solutions only when alkaline, or when an alkaline earth has been added, and ozonized air passes through the sugar solution until the alkalinity has almost disappeared. It must be very carefully watched so that the neutral point is not overstepped. It was found that a sugar solution first treated with lime in a proportion of 4% lime to 96% of liquor should be mixed, and afterwards treated with carbonic acid, so that an alkalinity is left of 1.5 grammes of lime per litre. The liquor passes through the filter press, the carbonate of lime is filtered off, and the filtrate is treated with ozonized air.

By this process the nitrogenous substances are oxidized, the albuminoids are precipitated, and the coloring matters destroyed. Afterwards sulphurous acid is passed through
the liquor, the alkali perfectly neutralized, and the mass filtered.

It was found that ozone could be applied until the alkalinity is entirely lost, but the inventor only treated the liquor as described.

7. STEIN AND CROSFIELD'S Process.—This new process, which I can only briefly refer to, has been tried for some time in the refinery of Messrs. Crosfield, Barrow & Co., of Liverpool. The process is partly chemical and partly mechanical, and is based upon the analytical factors obtained by analysis of the liquors and of the different raw sugars that are to be refined. As the process is still undergoing development, and forms the subject-matter of a patent, I cannot at present enter into details. We are, however, perfectly satisfied that after full investigation we shall be able to dispense altogether with animal charcoal, and still obtain crystals and cubes equalling any hitherto produced. The molasses are of good flavor and bright in color, and form excellent syrup for table use. I hope to be able, with the kind permission of the Council of this Society, to bring before you full details next session.—The Sugar Cane.

CULTIVATION OF COFFEE.

Weeding.—One of the most important points to be observed by a planter, if not the most important, is the regular weeding of his clearing. To keep your estate free from weeds from the beginning is a very easy matter, but having once allowed it to get into a weedy state, it is a most difficult thing to get it clean again, and it will take about two years of regular weeding and will cost almost as much as opening a new clearing; indeed, it may often be advisable, instead of trying to put a neglected place to rights, to abandon it altogether and to open new land.

To keep an estate clean, you must start weeding immediately after burning the jungle and you must continue to do so regularly at least once every month. A good many old and experienced planters argue that it does no harm to have weeds; that on the contrary, in hilly ground, it prevents the top soil
from being washed away and saves the roots of the coffee from being exposed to the sun. Believe me, the planter who argues thus is either a fool himself, or he thinks that you are one. The weeds will absorb all the nourishment instead of the young coffee, and if allowed to grow up will suffocate it altogether; they will also prevent the rain from penetrating the soil and reaching the roots of the coffee.

If you could turf your estate carefully and keep the turf trimmed and short and the soil cleared and forked for about 2 feet all round each coffee tree, as has been done experimentally in some gardens, your coffee would no doubt greatly benefit; but this would be a very difficult matter, and it would cost much more than weeding—in fact, it would never do on a coffee estate on a large scale.

The weeding must be done regularly from the very beginning at least once a month, the weeds must be taken out with the roots and then be either burned or buried; never leave them lying about your clearing between the coffee; if you do, they will grow up again in no time and be worse than before. If an estate is clean, a woman will be able to weed from 200 to 400 trees in a day; but if your estate is under weeds, she will not be able to do more than 10 to 20 trees. Thus 100 acres of coffee may be kept clean by 6 to 12 coolies; but if once under weeds, you require from 33 to 100 coolies to do it.

The result of neglect will not show itself on a coffee tree all at once; you may have your weeds growing a long time and not see any bad effect, but when once the bad effect is seen, when your trees get seedy and begin to fall off and to die out, then it will, in most cases, be too late for remedial measures; no amount of weeding and manuring will then bring the tree back again to its former strong and healthy condition, and even if your tree eventually recovers, it will only be after a long course of careful nourishment and nursing that any sign of improvement will be noticeable. Prevention in this case, again, is better than cure.

But should you by accident get your coffee into such a bad state that the trees become bare and look as if they were dying, although you have for a long time already been carefully nursing them, don't despair. As long as there is life there is
hope, and very often, when the trees are looking their worst, the experienced eye may discover signs of improvement and recovery. Let me compare such a tree with a man brought by fever to the very point of death: he has just got over it and is on the path to recovery; he feels like a new-born child, and yet everybody who meets him will say, "Heavens, what is the matter with you? You do look bad."

Let me now imagine that from one cause or another your estate has got under weeds and that you wish to get it clean. This is to be done only in a systematic way: first, weed about 2 to 3 feet round the coffee trees to give them air and to prevent them from being suffocated; and, secondly, begin weeding your estate at one end and go right on for 21 days. Weed as far as you can get within that time, then begin again from the point where you first started. You will get through it much quicker this time, perhaps in 14 days, this leaves you seven days more to go on weeding new ground, and so on every time you will be able to weed more trees with the labor force at your disposal, until at last you will be able to get right through the whole of your estate within 21 days. Then this is the time to gradually decrease the number of coolies employed on weeding, until your clearing is again in a normal condition; then you can get through your work with the ordinary number of coolies. But, let me tell you, this will take about two years.

My reason for advising you to weed once in 21 days is that most of the weeds blossom within 21 days, and you must therefore weed before that time, otherwise they will throw out new seed which will be blown and scattered all over the estate, and the weeds instead of diminishing will spread more and more every time you attempt to destroy them.

Some planters may advise you to go right through with your weeding, even if it takes you two months to get round the first time. Each time you go round, they say, you will have less weeds and be able to do it in less time; the second time you will probably be able to get through your weeding in one month. But if you follow this advice you will never succeed in getting your estate clean again, much less be able to keep it clean.

Supplying.—Having planted out your trees, you must not
imagine that you can be idle and wait quietly until they begin to bear. There are many things to do and to look after; of course you cannot do them all at once, so let us take them one by one. First there is the “supplying.” This means that when a tree has died or does not grow to your satisfaction, it is replaced or supplied by another. After the first good shower of rain—or, rather, after every good shower—you put your men on to this work. Don’t wait until you actually want to do the work, to find out which trees want supplying, but do this beforehand. Examine each tree as you walk through the plantation, and wherever you find a tree that wants supplying, mark it in some conspicuous way. You know then what you have to do, and immediately after a good shower you are able to do it, without your coolies running all over the place with baskets full of young trees and changkols, hunting here and there for dead trees which require supplying.

Very often a planter hesitates to replace a seedy-looking tree, thinking that with care and attentive nursing it may recover. This is misplaced sentimentality, although it is quite a natural human feeling, and I have given way to it myself more than once. In some cases I have had the satisfaction of seeing the tree recover, but in most cases I have been disappointed. In a practical planter’s life sentiment is out of place: we are here to plant coffee with the distinct object in view of making it pay, and there is no doubt that it pays much better to replace a doubtful tree, by a fresh and healthy one, than to try and improve it.

As I go on I find myself repeating the words, “this is of great importance, and I have come to the conclusion that everything with regard to coffee planting is of great importance, and I cannot close this chapter without calling your attention again to the importance of early and regular supplying.

The expenses of weeding, buildings, supervision, drains, etc., will be exactly the same for an acre of good and healthy trees as they will be for an acre of seedy, half-starved or struggling-for-life miserable things; but whilst the former in course of time will give you handsome returns and great satisfaction, the latter will always remain a source of heavy expenditure,
without returns but with unlimited worry, trouble and dissatisfaction. Now judge for yourself, and say whether supplying is of importance or not.

Handling and Pruning.—A friend of mine once remarked: "Any fool can plant coffee and open an estate, but it is in the pruning and handling where the experience of the planter shows itself." It is an art, and you must know what you are about. If you don't, you had better leave the tree alone, and probably much less harm will be done than by cutting off any quantity of wood and branches which cannot be put on again. If left to itself, the coffee will generally develop into a nice and regularly shaped tree, and grow up to a height of 20 to 30 feet. But we do not allow our trees to grow so high; generally we top them when they are about 5 or 6 feet above the ground, just so high that a coolie can pick the berries without having to use a ladder. One might wonder why a tree should be cut off 5 feet above the ground when its natural habit is to grow up to 20 or 30. The reason is that when the tree grows up, the higher branches develop at the expense of the lower ones, whilst a tree topped 5 or 6 feet above the ground will shoot all its strength into the lower branches and make them spread over a much wider surface and bear more fruit than otherwise; then there is the advantage, as I have mentioned already, that you do not require ladders to pick your crop, which is a distinct advantage, for the use of them will always cause a certain amount of damage to the tree, however careful you may be.

Some planters believe in letting their trees grow up to any height, notwithstanding the above difficulties and the difficulty of handling and pruning such trees, and as marriage is a failure when it is a failure, so is a coffee tree a success when it is a success, and both ways—"the topping" as well as the "not topping"—have their advantages and their disadvantages; but where eminent men differ, I do not consider myself a competent judge to decide which of the two systems deserves preference.

Coffee is a plant which requires continual looking after; from the moment it is put into the nursery until the last day of its existence it must be attended to regularly every month. There is, for instance, the handling. As the coolies go along
weeding they remove all suckers and dirt from the trees, bend the branches, and clean the stem from all parasites, ants, etc. Suckers are branches which grow upwards from the tree, and which would, if left alone, develop into another stem.

Then there is the pruning. But before I begin to describe the pruning, I must explain the different parts of the coffee-tree, or you will get bewildered about suckers, gormandisers, primaries, etc.

A tree consists of (1) the stem; (2) the branches growing out of the stem: under these I do not include the "suckers," which I have already explained, but branches growing out of the stem and spreading to the right and left of the tree and not growing upwards, these are called the "primaries;" (3) the branches, which grow out of the primaries, these are called "secondaries;" (4) of the branches which grow out of the secondaries, these are called "tertiaries;" and (5) the branches which grow upwards out of the above branches, these are called "gormandisers." Gormandisers, in the same way as suckers, will develop into individual trees and will take away the strength from the original tree, they nourish on it, and it accordingly suffers, and therefore all suckers and gormandisers are carefully cut off and not allowed to develop to any size.

The tree may have as many primaries and secondaries and secondaries to grow out of a primary within a space of six inches from the stem, so that light and air can always penetrate right along the stem, and it has the additional advantage of rendering it easy for the coolie to examine the tree and to keep it clean. All dead wood is cut off the tree. Never allow more than one branch to grow out of the tree from one and the same spot: if there are two or three, remove the others and only leave the one which promises to turn out the best. All branches growing upwards and downwards and inwards instead of outwards are cut off.

This is the art of pruning, so far as I can explain it here. It is easy when you know it, but, etc.

Mr. J. Ferguson, in his "Coffee Planter's Manual" (third edition, Colombo: A. M. and J. Ferguson, 1894), among other re-
marks about pruning, writes: "Where a plantation has been carefully tended in its earlier years, where it has been properly and regularly handled, it will not, when it arrives at maturity, give much trouble in trimming; and except the cutting of dead wood, or wood that has borne (for the same wood never bears twice), removing suckers, cross branches, and exuberant shoots from the centre and along the primaries in the way hereafter explained, there will be very little to do in that line for some time. It is after an estate has borne two or three crops—after it has, either from overcutting or from want of timely handling been allowed to get matted, umbrella-topped, or chocked up by superfluous wood—that the real difficulty of pruning begins. It is now, too, that the planter’s skill and science are called into play." And later on, "I now come to what I consider the most important step in the pruning of the tree—the secondaries—because you have to deal with what is to give a great part of your next year’s crop."

A writer, whom I have already quoted, a well-known planter of great experience, in an able paper on Pruning, which he addressed some years ago to the Planters’ Association, describes this operation, and that of handling generally, so well that I take the liberty of giving his directions in his own words:

"To ensure a regular and strong tree, then, handling must be resorted to early. In doing so, take off all the branches that are within six inches of the stem, and make an opening of one foot in circumference in the centre of the tree. This, besides strengthening the primaries, will permit the sun and air to penetrate, both of which are beneficial to the growth of the tree as well as the ripening of crop. Next run along the primaries and single out the secondaries, leaving no pairs, but one secondary only at each joint, on either side of the primary alternately. This, I know, is thought very unnecessary by a large class of planters, but if they will only study the tree itself, they will find that although nature throws out the secondaries in pairs almost invariably one is stronger than the other; and by a little care the strong ones can be left and the weak ones taken off. It is better to look to the strength of the wood than the quantity of it. As secondaries left on too near the stem tend to weaken the primaries, so do they when left in pairs, cramping, as it were, that expansion which takes place under the treatment I advise."—Madras Planting Opinion.
One of Florida's most profitable industries, and one that is receiving more attention each year, where the conditions are favorable, is the raising of pineapples. As is well known, the east coast of the state below Titusville is the locality where the industry has reached its highest and most profitable development. Two years and a half ago it was practically wiped out by the disastrous freeze that cost Florida so many millions of dollars in the destruction of her fruit products. Now, in less than three years, this form of farming has risen again to greater proportions than ever, and the crop of the present season will exceed by fully seventy-five per cent. and perhaps one hundred per cent., the largest ever shipped from the state. That it is profitable is proved by the returns that have been received for that part of the crop that has been shipped up to this time. The returns have been most satisfactory, and though the season is a little more than half over, these prices continue to be good and remunerative.

The growers of the east coast have formed themselves into an association under the name of the Indian River and Lake Worth Pineapple Growers' Association, and an office has been established in this city, under the management of E. P. Porcher, general agent, who is located on the docks of the Plant System. A visit to his headquarters gave a little insight into the magnitude of the business, and the manner in which a large portion of the entire crop is being handled. The long shed was piled high with crates, nearly 5,000 of them, that had been received during the day awaiting shipment. In the office on the dock five or six clerks were busy keeping track of the valuable property intrusted to their care. All were working with loosened collars and the perspiration rolling from them, for the location, even though it is so near the river, is not a cool one. Their work must be done before the day is ended, and hot weather, rain or shine, or cold, affords no excuse for failure, for trains, like time and tide, wait for no sluggard.

Many Innovations.—The work that has been laid down for the association is perhaps unique, in that it seeks to introduce
many innovations in the manner of handling fruit, and it is safe to say that never before in the history of Florida fruit raising and shipping has the idea of this association been carried out to the extent that is being done here. Many advantages are claimed for these methods, and the results that are obtained seem to prove that they are practicable and of great value to the members of the association. The central idea is that if every crate of fruit could be handled through one agency, which could be kept thoroughly informed as to the condition of the markets in every part of the country, the largest returns could be obtained for the product. Incidental to this idea is that of stopping the promiscuous consignment of fruit by growers, by which the markets are broken and the best prices made impossible. The association, through its agent, seeks to provide and patronize only reliable agents in each of the larger cities of the country—men whose records make it certain that every cent is obtained for fruit will be accounted for to the grower. It also seeks to instruct the grower, through the practical experience of what is demanded by the consumer, in the best methods of packing, in order that fruit may reach its destination in the best possible condition.

Experience has taught the growers of this association that the Red Spanish variety is the best that can be raised, every condition being taken into consideration. The fancy varieties require more careful handling, the product to a given acreage is much less, the returns in many instances, especially late in the season, have hardly paid the expense of raising.

Method of Packing.—Several changes have been found advisable in the manner of packing since the association has been formed. One of these is the adoption of the standard crate with measures 11x12 inches by 36 inches long, with a partition in the middle. The larger portion of these crates are of the solid head kind, although a few panel heads are used. The former cost about 9 cents, and the latter about 1 cent more. Formerly the barrel crate was used, which was about double the present dimensions, but it has been found that the standard crate is best adapted for packing the most popular sizes of pines. The preferable sizes are twenty-four
and thirty pines to the crate. Other packs are also used, as thirty-six, forty-two, and forty-eight, besides odd packs that do not find favor in the markets. Smaller sizes than these are not considered marketable. Most of the pines that are shipped are wrapped in strong Manila paper, cut fifteen by twenty inches in size. This wrapper prevents bruising in the crate by reason of the contact of the apple with the sides of the crate, or with other apples. All but a very few of the shipments to the northern markets this season have been made in Armour refrigerator cars. All of the fruit handled by the association agency in this city has come from the east coast of the state, a rule of the association prohibiting the handling of fruit from the keys or from other parts of the state than the east coast. Many requests have come from other localities that fruit should be sold through the association agency, but the rule referred to has prevented. Three hundred crates are considered a carload, and this number can be safely and snugly packed into a car of the standard dimensions without fear of jarring or falling in transit.

How Prices are Affected.—The practical operations of the association during the present season have demonstrated several things. It will handle, according to Mr. Porcher's estimate, nearly ninety per cent. of the east coast crop that has not been sold in the field to northern buyers. That portion of the crop that is sold to these buyers does not affect the prices in outside markets, for the original cost at the place of production prevents. The greatest fear of a breaking market is from those shipments that are made independently of the agency to irresponsible commission houses, which guarantee large returns and find that they have bargained to do more than they are able to perform. In a recent circular to his growers, Mr. Porcher made use of the following sentence, that illustrate this point: "If every pine in the territory of our association was marketed by the association, we could obtain 25 to 50 cents more per crate in most of the markets. It can be proved that lots go by solicitors for forwarding outside of the association have been the cause of cut prices. In Philadelphia, two receivers of fruit sent outside of the association have put the fruit in auction room and catalogues of sale,
which I have, show the prices that must give disappointing
returns to the shippers."

By the control which the association has both of shippers
and of agents, it is able to regulate both to the mutual advan-
tage of both. The results have shown that very little fruit has
been received in bad condition, because of the caution that has
been given the shipper, and the best prices have been received
by reason of a wise selection of agents and a timely choice of
the markets in which the fruit has been placed.

The arrangements that have been perfected by Mr. Porcher
for shipping and for always keeping available a complete
record of the fruit that passes through his hands in this city,
are most elaborate. Being somewhat complicated, a detailed
description is not necessary, but it may be said, that the
records of his office will show at any moment the disposition
of each package of fruit that has been handled through the
entire season, the number of crates shipped by each grower,
the number of pines in each crate, the agent through whom it
was sold, the returns for it, giving the price and the exact cost
of shipping, the amount of commission charged, as well as the
time that it was received at Jacksonville, the date of its re-
cipient at destination, and the date of sale. A more complete
system could hardly be imagined, as it furnishes for ready
reference a perfect history of each package handled.

Big Crop This Year.—The crop shipped from the east coast
in the season of 1894, and the last year before the freeze,
amounted to about 65,000 barrel crates, or 130,000 standard
crates. Up to and including the shipments of Thursday last,
there has been sent through his agency 248 cars of the fruit
in solid carloads, besides a considerable amount in less than
carload lots to nearby points in this and neighboring states.
As the present time is about the height of the shipping sea-
son, the fruit is being received here at the rate of from ten to
twenty cars per day. The receipts of each day are sent for-
ward by the first train northbound, and each night finds the
dock as clear of fruit as it was in the morning, before any of
the shipments of the day had been unloaded. A considerable
portion of the fruit is made up into carloads at the place of
shipment, and is not rehandled here. With rare exceptions
only less than carload lots are rehandled here.
The prices that have obtained so far this season have been very satisfactory for the standard sizes, but the smaller sizes have not been yielding returns that have proved satisfactory. These prices for the desirable counts have ranged from $3 down, although for the first shipment of the season $3.50 per crate was the price obtained.

As suggested before, the attempt to control the entire output of a given crop of a locality, with the idea of gaining for the grower the best prices, has not been before undertaken on the scale that it has been in this enterprise, but the practical operation of these methods seems to have demonstrated that a combination may be made for mutual protection that cannot be classed as a trust or monopoly, and from which only the most satisfactory results may be obtained without harm to any.—Florida Citizen.

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COFFEE DRINKING AND HEALTH.

Modern science is directing its searchlight into many dark places and dispelling errors which held our forefathers in thrall. One by one these popular misapprehensions wither up beneath the rays of medical enlightenment and scientific progress, and in their place come wider wisdom and increased knowledge of the good things that have so liberally been bestowed for our use and benefit.

Take, for example, coffee, one of Nature's kindliest gifts to man, but which has been misunderstood and maligned by smatterers in science, who entirely overlooked its rare therapeutic value and the consequent physiological benefits following its use. Contrary to the mistaken notions too frequently expressed by the unknowing and copied into newspapers, without regard to their trustworthiness, it is a fact, based upon scientific demonstration, that good coffee possesses great value as a nutriment, in addition to its mildy stimulating qualities, which materially assist digestion.

The writer believes that the best coffee, for illustration, "Banquet" Java Coffee, has a food value second to no other single article in the menu, and this view is supported by the testimony of representative medical men, to whom inquiries
were put. Whilst coffee is not only a welcome but likewise a beneficial addition to the household bill of fare, it should be borne in mind that there is a wide variance in quality in the different brands offered in the market. Sometimes careless roasting, or, failure to properly prepare the berry, or inattention to the requirements of a perfectly roasted coffee, result in a product whose value is doubtful, hence the maxim, "the best only is good enough," should be rigidly applied by every prudent purchaser. For instance, no mistake can be made in selecting best Java or Hawaiian coffee, as it is always of uniform quality, superlative flavor, and, whilst full of strength, is yet so intelligently blended that its delicacy renders it extremely palatable to the most delicate appetite or most fastidious taste.

As to the benefits to be derived from the use of coffee: First, that which renders a meal appetizing and inviting has a tendency to make it more digestible. Secondly, coffee gently stimulates the salivary glands and acts beneficially upon the trophic nerves, in fact, assists materially in the functions of digestion and assimilation. Again, it has an anti-malarial tendency, and may be used to rare advantages in miasmatic conditions, and will frequently prevent zymotic diseases characterized by chills, ague or slow fever.

It will thus be seen that instead of being harmful, good coffee is positively a benefit, and that in spite of the dictum of the unlearned that coffee is "trying to the nerves," it tones up the nervous system and is in every sense of the word a true food—rich in nutrition and productive of bodily vigor.

AGRICULTURAL EDUCATION.

Briefly stated, the object of agricultural education is to teach the most enlightened methods in the cultivation of the soil, so that the cultivator may secure the best results while the fertility of his land is maintained. As the wealth of a nation depends upon the agriculture of the country, it is but fitting that agricultural education should receive Government aid in as large a measure as any other department of education. At the same time agricultural education should be made
as attractive as possible to all, for there are few persons, particularly in the Colonies, that have not a direct or indirect interest in the soil. It is a mistake to imagine, as some do, that the results of agricultural teaching can be gauged by the number of scholars, who after their training at school cultivate their own lands. If this test were applied to agricultural colleges abroad, it will be found that the majority of those who are taught at these schools are by no means intended to be farmers. The more the individuals of a community—no matter in what capacity they are serving, whether as professional men, Government servants, or in private employ—know of agriculture, of the soil and the plant in all their bearings, the better for the community and the country to which they belong. We do not think of limiting the literary education of a boy because he may not intend to be a literary man, or what is popularly called his "scientific education," because he has not made up his mind to be a worker in science. The object of education in its widest sense is to expand the mind and enable men to think and act under the various circumstances in which they may be placed. It is but meet that we should make themselves acquainted with our natural surroundings—the soil, the air, plants and animals, and the various relations in which they stand to one another. Unfortunately there are some people who are proud to own their ignorance of these matters, and others who imagine or pretend that they know all about them, when in fact their ignorance is prodigious.

In this country we should greatly desire to see all minor native officials possessed of an up-to-date knowledge of agriculture, such as will equip as well as actuate them to take an active, intelligent, and honest interest in the welfare of their more ignorant and conservative brethren who are engaged in agricultural operations.—Trop. Ag.

A DEMERARA PLANTER'S VIEWS ON LOUISIANA CANE PLANTING.

Is it not strange how all sugar countries seem to have some particular weak point which more or less gives other places a chance in competing with them? The east end of Cuba and
the east end of Java are the least open to this criticism of any
places which I have visited. In Louisiana there is more than
one fly in the ointment. Not only is the sugar cane a forced
rather than a natural production in the States, but the im-
mense portion of the crop which has to be taken for seed pur-
pposes is to me a new feature. I, of course, was aware that they
used the entire cane for seed where we use tops, but I had no
idea of the very large proportion of their crop which was taken
for this purpose. It takes from four to six tons of cane to the
acre to replant a field. The canes are laid in two rows side by
side with a small overlap, and the rows are planted about 7½
feet apart, so as to allow of easy cultivation with mules and
implements. The stiff ground takes a four-mule plow until it
is got into good order. The lighter soil is done with a pair of
mules. One friend of mine told me that he had over $200,000
sunk in stock and implements for the purpose of working his
land. A little of the land is put into cane in the autumn when
the fields are first cut, second ratoons being mainly used for
this purpose. The balance of the second ratoons is then wind-
rowed, much as beet or other root crops are preserved from the
frost in England, and the entire cane used for planting pur-
poses in the spring. The fall-planting takes less cane, and
gives slightly the best result.

Haulage is another of the serious items which the Louisiana
planter has to face. It will cost there between five and six
dollars per ton of sugar to get the raw material delivered from
the field on cane-carrier. In Demerara we can cut and deliver
for less than half that amount.

In point of defecation they certainly do more than we do,
and I think that they are right and we are wrong. The most
modern system they have on their up-to-date estates is some-
what as follows: The juice is pumped into a tank where lime
water is added, aerated sulphur fumes are blown into the
juice which then passes into a superheater and goes into three
large tanks, overflowing from one into the other. Here a cer-
tain amount of sediment is caught, and the juice on issuing
from the third tank is again heated to about 200, and passed
through filter presses and bag filters, the whole of the juice
getting double filtration but no phosphoric acid. Then comes
the evaporation, which is similar to ours in all respects. West-
on centrifugals being those most generally used.—Corr. Dem.
Argosy.