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STEAM BOILERS.

The great number of steam boilers in use on these Islands, and the various modes of constructing the furnaces and flues so as to get the best results from the fuel used is a matter well worth consideration, and any one who succeeds in making such improvements as will enable our planters in their sugar-works to do more work with less fuel, or we may say with less combustible fuel, such as trash direct from the mill, puts both planters and those dependent upon them in a much more prosperous position.

Many improvements in boilers and boiler setting have been introduced on many of our plantations during the last seven or eight years, and yet we have to acknowledge after all that even under the most favorable circumstances, and where the combustion is tolerably complete, but a small percentage of the available material in our fuel is arrested and brought into useful effect. Certainly not more than ten per cent., and in cases where the combustion is incomplete, and where foul tubes and other heating surface is the rule, coated with one of the best non-conductors of heat, not even five per cent. is arrested and made use of; the balance usually rolls out at the top of the chimney in dense black clouds—just what is used today in some places, together with a certain proportion of highly heated air, to make excellent fuel for steam boilers.

In order to economize in fuel it is necessary to keep not only the tubes but all the heating surface of our boilers very clean. No labor in our sugar-works pays better than that expended in keeping the boilers clean inside and out. This done well, and plenty of air admitted to the furnaces, heated or otherwise, all boilers will do much more work with the fuel consumed than they usually do.

It is also a well known fact that high pressures are more economical than low. Since the introduction of the compound engine with surface

condensers, and the great increase of pressure in marine boilers, 70 to 100 pounds per square inch being now considered quite moderate, a saving of nearly fifty per cent. in fuel has been accomplished.

These high pressures, however, have brought about a demand for a better class of boiler materials, and instead of using iron plates of increased thickness proportionate to the increase of pressure, marine engineers in Great Britain and on the continent of Europe have almost universally adopted the use of what is called mild steel or homogeneous iron plates as the best material for boilers when dealing with high pressures; and it is the exception to-day on the Clyde and other high class ship-building districts to see an iron boiler being built. The only thing that prevents the same state of things existing in the United States, is the fact that steel plates are yet too high, the prices being at least double that of the European plates.

At first when steel begin to be used in the construction of steam boilers many were the failures and disappointments, until an almost steel-less steel was produced, having a tensile strain of little more than that of the best American iron plates, but perfectly homogeneous, and so ductile that when samples are heated to a cherry-red heat and plunged into cold water, they may be afterwards doubled over on themselves cold without the slightest sign of fracture. This is the boiler steel of the present day, and so great is the demand for it that new steel works are springing up by the score all over England and Scotland. The out-put of the Steel Company of Scotland at present is from 80,000 to 100,000 tons per annum.

The advantages of this material for high pressure boilers over iron plates are apparent to even the most superficial observer. Thick plates interposed between the fire and the water hinder very much the absorption of heat by the latter, and on that account are not desirable. And yet we must have such boilers as will carry about six times the working pressure, before either bursting their shells or collapsing their flues. This may be done by using for extreme high pressures the material above referred to.

Tests of the steel boiler plates made by the steel company of Scotland, show that the specimens operated upon stretched 25 per cent. of their length in the 10″ where the fracture took place before ultimately giving way, and the contraction of area at the fracture was over 49 per cent. before parting. This shows the superiority of mild steel over that of iron. Steel plates being 36 per cent. stronger than iron.

Should such a thing happen that a boiler made of such material should be strained to its bursting pressure, the parts between the rivets would stretch so much that it would be impossible almost to explode, for as may be clearly seen the contents of the boiler would escape gradually through those openings; besides timely warning would be given.

Several cases have occurred in which from low water in the boilers the flues of steel boilers have been allowed to get red hot and collapse like a

bag, but without a fracture, and without any damage done beyond spoiling the flues. In such cases iron flues would have given way, and an explosion would have been the result.

The time is not far distant when even in these Islands iron boilers will be amongst the things of the past, and iron boiler plates with their laminations. Three or four ply will be considered utterly unfit for steam boilers carrying from 100 to 150 lbs. pressure—for these are the pressures to be used shortly if economy is to be the order of the day in fuel, and we are safer with 150 lbs. pressure in good steel boilers than with 70 lbs. in the iron pots we are now using. High steam carried to each of the steam-using machines in well protected pipes, together with the use of vacuum evaporators, will put every boiling house and mill perfectly independent of coal or wood, and in some cases trash may be saved for manure.

Should the diffusion process, which is strongly advocated by some of our planters, be adopted here, the whole of the evaporating of the juice, diluted with a certain percentage of water, will have to be done by coal or wood. Then our consumption of coal (for wood is not to be had) will be two or perhaps three times as much as it now is. Of course all this and a great deal more, it is claimed, will be covered by the additional quantity of sugar got from the cane over what is possible by the process of expressing the juice by the best kind of rollers. Economy in fuel will then mean a good deal more than it does now. Then high pressure steam and triple effect will be the order of the day.

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KOLOA SUGAR COMPANY vs. THE GERMAN LABORERS.

The above case occupied the attention of the police court of Honolulu for four days during the past month.

Thirty-three German workmen struck work, and in defiance of the local district justice, refused to have the case tried in Koloa, and came to Honolulu to see the German Consul, Mr. H. F. Glade. The Justice asserted his authority and soothed his wounded dignity, however, by sending a mittimus after them committing each to prison for 10 days for contempt of court.

The men are some of the immigrants who came last April, and are working under contracts made in Germany, for periods of four years; at $16 a month for the first year, with an increase each succeeding year.

The Consul appeared on behalf of the laborers, and each case was carefully examined into, and as a result the men were all ordered to return to

service under their contracts, as no breach of the contract on the part of the plantation had been shown.

The action of the laborers appears to have been instigated by two or three discontented spirits, and the most of them presented complaints of the most frivolous character.

Although they have been at work for four months, the majority of the grievances consisted in the facts: first, that the half acre of land to which each laborer is entitled under the contract, had not been specially pointed out and delivered by the manager, although they acknowledged that each house stood in a square marked by a furrow, and that they had had the land and were cultivating it; second, upon one occasion, (and in a few cases, twice) the fresh beef, which is furnished twice a week, had been bad, or a few ounces short weight. With very few exceptions, no complaint had been made to the manager, the men stating that they prefered to come to Honolulu and lay their complaints before the court.

When about half through the case the Consul became disgusted with the succession and insignificant nature of the complaints and withdrew from the case.

Fourteen of the men consented to return, and have gone back to work. The others have appealed to the Intermediary court, and will be heard next week before Chief Justice Judd.

It is a difficult thing to reason with unreasoning and unreasonable men. But as the loss to the plantation through any action such as the above is always a heavy one, the old adage that "an ounce of prevention is worth a pound of cure," is very applicable. Suavity of manner on the part of a manager, and the going out of his way even, to enquire into small grievances, especially in the cases of new comers who are not accustomed to the ways and methods of plantation life, will frequently prevent a great deal of trouble and expense.

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A FOURTH OR BREAKING ROLLER.

A fourth or breaking roller is used on some of the sugar mills in Australia. Mackay's work on "Sugar Cane in Australia," describes it as follows:

"This improvement, like many other good things in sugar machinery, is of French origin. It has been very generally adopted in the Colonies. The fourth roller is fluted, or serrated. It is of the same length as the other rollers, but much smaller. It is set up in front of the first roller of the three upon a stout plate, and catching the canes first, it breaks them open. They then pass the other rollers as usual. The result is very satisfactory, and far more than compensate for the power necessary to move the fourth or breaking roller. It is geared to the ordinary machinery, and can be fitted on to almost all mills of modern construction."

PORTUGUESE IMMIGRATION.

The past few weeks of our history have been remarkable in developments concerning our immigration interests which are not creditable to the Government. These matters are supposed to be conducted by the Board of Immigration, of which the law makes the Minister of the Interior to be the head, but under the present administration the supremacy of that official over the Board has become merely nominal, it having gone the way of nearly all the other discretionary powers of our government and been "absorbed" by Mr. Gibson.

In discussing these affairs then, we may with justice and accuracy ignore the existence of a Board comprising only a few gentlemen who appear to be mere *factotums* or voting machines,—and ascribe the mischief directly to its legitimate source, Mr. Gibson,—not forgetting to reserve a share of our censure for the organic system of government which permits these startling encroachments by one man upon the rights of the community.

Among the most satisfactory of our immigration schemes, as measured by results, has been that providing for the introduction of Portuguese laborers with their families. To accomplish this it has been usual for agents of this government to contract with these men to serve at a specified rate of wages, with such of our planters as, upon their arrival here, they should be directed, in consideration of having their passage to Honolulu paid by the Government of these Islands. Upon their arrival here they have been assigned to the different applicants, from whom the Government has collected the amount expended for their passage, thus acting merely as a medium through which the planters dealt with the laborers or those bringing them to our shores.

The Messrs. Hoffnung & Co., of London, have been most conspicuous for their enterprise in thus furnishing us with labor, and have, until recently, maintained satisfactory relations with the Government in that regard. But the country was lately surprised and alarmed to learn—*by way of London*—that Mr. Gibson, acting in his usurped capacity of Board of Immigration, had informed the Messrs. Hoffnung that in all further Portuguese immigrant transactions the Government would pay seventy-five per cent. of the passage money in Government bonds. The result has been a very justifiable loss of confidence in the integrity of our Government on the part of all concerned, and may probably result in the utter abandonment of a scheme of immigration to whose continuance and expansion our planters and others have looked forward with much satisfaction.

In what statute Mr. Gibson finds the warrant for such a course, or by what system of logic he would excuse or palliate this autocratic and mischievous action remains to be explained. That the Government should take cash from the planter with which to pay these immigration expenses,

and then insist upon pocketing the cash, and in lieu thereof foist Government bonds upon the gentlemen who have conveyed hither the immigrants, will scarcely commend itself as a reasonable proposition to those whose perceptions of political and commercial integrity have not been blunted. This is the second time that the Portuguese immigration has been interrupted by the present administration. The first time it was upon the excuse that the rates were too high, and after an interruption of a year was re-opened upon a basis no more favorable to the planters than before, and the second time it has been interrupted without the shadow of excuse and with a reckless disregard for the agricultural interests of the country.

The importance of the labor question to our commercial interests may not be exaggerated. It is of vital concern to our very commercial and industrial existence. We therefore submit that the execution of our immigration laws must be rigidly scrutinized. Their just and liberal exercise should be encouraged, their obstruction or perversion condemned and resisted, and all who in any way aid in their distortion or nullification unsparingly censured.

For the present we pass without comment that most unsavory scandal concerning the five dollar per head charge in connection with Chinese immigrants, but should we find it unexplained a month hence, we may give it the attention it demands.

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IMPORTED SUGAR MACHINERY.

ONE of the principal points of inquiry by the committee sent here by the U. S. Senate to investigate the working of the Reciprocity Treaty, was concerning the country from which machinery was obtained. The following statement, made by Messrs. T. H. Davies & Co., and embodied in their report to the committee, shows the small proportion of material imported from England for use by the Honolulu Iron Works (the only foundry at these Islands where sugar machinery is made), and also the fact that although Messrs. T. H. Davies & Co. are the largest English importing house here, and are agents for eight or ten sugar mills, they have imported no machinery from British ports.

"All the plantations under our control have procured their machinery here (except one which the owner catered for), and as the Iron Works Co. get all their engines, pumps, copper coils, tubes, boiler heads, and other important work from the Farrell Foundry, National Tube Works, and other American factories, it is impossible to say what proportion of the machinery given as "made here" is imported from the United States. We have ascertained, however, that during the seven years from May, 1876, to April, 1883, the imports by or for account of the Honolulu Iron Works Co. have been in the proportion of:

U. S. Ports	$390,000	=76 per cent.
British Ports	122,000	=24 per cent.
	$512,000	

KAUAI PLANTERS' ASSOCIATION.

Proceedings of the Kauai Planters' Association at Hanamaulu, Kauai, August 24th, 1883.

In conformity with invitations issued by Capt. L'Orange of Hanamaulu, the following named gentlemen met at his residence on Friday, August 24th. 1883.

G. H. Dole.....Kapaa.
G. N. Wilcox.....Lihue.
C. Isenberg.....Lihue.
W. Meier.....Kekaha.
A. S. Wilcox.....Hanamaula.
Antone Cropp.....Koloa.
August Hanneberg.....Koloa.
W. F. Grant.....Kilauea.
Chas. Koelling.....Hanalei.
L. Stolz.....Waimea.
W. H. Rice.....Lihue.
W. Blaisdell.....Kealia.
S. B. Dole.....Honolulu.
H. M. Whitney.....Honolulu.
F. Allen.....Honolulu.
Capt. C. L'Orange.....Hanamaulu.
F. Bindt.....Eleele.

At the request of those present G. H. Dole, Esq., called the meeting to order, stating the object to be the consideration of the labor question in general, and of the Chinese day laborer in particular.

Frank Bindt was chosen to act as Secretary. After a full elucidation of the pros. and cons. of the Chinese day laborer, Mr. C. Koelling made the following motion, seconded by Mr. W. Blaisdell, viz:

"That the wages for Chinese day laborers on the Island of Kauai be fixed at seventeen dollars a month, or its equivalent, to take effect from and after the first day of September next. Carried unanimously. It is to be understood that at this rate of wages the laborer has to furnish his board."

It was further moved and carried, that the following plan be recommended to the Planters' Labor and Supply Co., at their next annual meeting, to wit:

"That each Planter upon the discharge of any contract or day laborer, furnish him with a certificate, marked with the Plantation Stamp, stating the fact, and the date of his discharge, and his character as a laborer. Such certificate to be shown by the laborer when seeking new engagements, and upon his making new engagements, to be delivered up to his new employer to becancelled.''

The desirability of a permanent organization of parties employing laborers on this Island, being acknowledged, a motion was made by A. S. Wilcox Esq., to organize permanently, under the name of the Kauai Planters' Association, draw up By-Laws and elect officers, further particu-

lars to be completed at next meeting. This motion being duly seconded was carried by an unanimous vote.

The Chairman appointed S. B. Dole Esq., a Committee of one to draw up By-Laws, who then offered the following

BY-LAWS OF THE KAUAI PLANTERS' ASSOCIATION.

ART. 1st. The name of this Organization is the Kauai Planters' Association.

ART. 2d. Any resident of the Island of Kauai employing labor, either in Planting or Grazing enterprizes, may become a member of the Kauai Planters' Association, upon a two-third's vote of the members present at any meeting of the Association.

ART. 3d. The Officers of this Association shall be a President, Vice President, Secretary and Treasurer, who shall be elected by a majority vote of the members present at any meeting, and shall hold office for one year, or until their successors are appointed. Vacancies may be filled at any meeting.

ART. 4th Meetings shall be held on the Island of Kauai, at any place and time, by notice from the President and Secretary to the members. The President and Secretary shall also be obliged to call meetings whenever requested to do so by five members.

ART. 5th. These By-Laws may be amended or repealed at any meeting of the Association, by a two-thirds vote of the members present.

On motion the foregoing Articles of By-Laws were adopted unanimously.

It was further moved and carried, that all of the gentlemen present, coming within the requirements of Article 2d, of the foregoing By-Laws should hereby be constituted members of this Association.

The election of officers, in accordance with Article 3d, was then proceeded with, resulting as follows:

G. N. Wilcox Esq.....President.
G. H. Dole.....Vice President.
Frank Bindt.....Secretary.
A. S. Wilcox.....Treasurer.

There being no further business before the meeting, the motion to adjourn *sine die* was carried unanimously. FRANK BINDT, *Sec'y.*

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PORTUGUESE IMMIGRANTS.

— The steamer *Bell Rock* left St. Michaels on 30th August with about fourteen hundred Portuguese immigrants, the same number as was brought by the *Hankow* This steamer will come directly to Honolulu, not calling anywhere for coal, and, as she is a new vessel and this is her maiden voyage, she may be expected to arrive in this port on the 25th of October, possibly sooner. This will be the last lot of Portuguese that may be expected for some time, although the number coming falls short of those required by the planters some months ago by seven hundred, as His Excellency the Premier has decided, without consulting the planters or the members of the Board of Immigration, to suspend the importation of Portuguese.—*Daily Bulletin.*

COST OF PORTUGUESE IMMIGRATION.

In Mr. G. W. Macfarlane's report to the Board of Immigration, upon the result of his investigations into the Portuguese immigration business, as conducted by Messrs. Hoffnung & Co., of London, after setting forth his reasons at length, he says:

* * "On the whole I have satisfied myself that taking into account the difficulties of the business, the large amount of labor and attention it entails, and all the risks involved, the price which Messrs. Hoffnung & Co. have hitherto charged is not an unreasonable one, and to my mind, does not leave a margin of profit commensurate with the extraordinary risks undertaken by this firm. * *

"After various discussions with Messrs. Hoffnung & Co. I am happy to report that I have come to an arrangement with them which will result in a saving to the Government and planters of about $30,000 on the price previously paid, upon the number of families which we have at present orders to send forward.

"I have already stated that looking at the intricate and delicate nature of the business and risks involved, I find on actual examination of facts and figures that the price heretofore charged by Messrs. Hoffnung & Co. was not an excessive one, and on their making concession in price of £2 ($10) per adult passenger, which I insisted upon, I was obliged to make one or two not unreasonable concessions in return."

That is to say, under Messrs. Hoffnung & Co.'s former agreement, the charge was at the rate of $100 for each adult passenger, but by the new contract negotiated by Mr. Macfarlane, the charge was to be reduced to $90 for each adult passenger.

Upon inquiry at several of the plantation agencies concerning the relative cost of Portuguese immigrants before and after the negotiation of the new contract by Mr. Macfarlane, we learn that the cost to the planter of the immigrants under the Macfarlane contract is not less than formerly, but on the contrary more. The former cost was $100. The present charge is $101.10. The sum of $1.10 now being demanded by the Portuguese Consul in Honolulu, although for what reason is not made clear.

Mr. Macfarlane assures us that the contract as completed by him, with Messrs. Hoffnung & Co. was at the rate of $90 for each adult passenger, being $10 less than the former rate. As a matter of fact the planters have been charged by the Board of Immigration $100.

Inquiry at the office of the Board of Immigration has produced no result further than the statement that "orders have been given to charge a round hundred the same as before."

If planters must pay a "round hundred" in order to obtain Portuguese laborers, they are ready and willing to do so, but they want to know why they have to pay $100 when the contract calls for but $90? What has become of the other $10?

SUGAR PLANTERS AND SUGAR MAKERS.

A correspondent of *The Sugar Bowl* presents such sensible views on the above subjects that we quote the whole article:

NEW ORLEANS, August 23, 1883.

Editor Louisiana Sugar-Bowl:

DEAR SIR—A very important subject has at last been brought before the sugar planting interest and sugar manufacturers—one which should have attracted their attention sooner, for had it been fully appreciated and discussed long ago, many thousands of dollars could have been saved by enlightening all interested parties. It is the question of difference in yield of the canes through causes that seem beyond the reach of all these parties concerned, and yet can be removed by proper methods, if adopted both by owners and employees, or by sugar planters and sugar makers. Mr. Giffen, at the last meeting of the Sugar Planters' Association, on the 14th of July, read a paper and very plainly and justly explains his views on the subject. He speaks of the causes of this difference as being from cultivation, from defects in our manufacturing apparatus, from bad manipulation of the cane juice, from wrong evaporation of the syrup, and still worse crystallization of the sugar by nine-tenths of our sugar makers who do not take time to acquire the knowledge necessary to be able to make a strict and correct estimate of the work they are doing, and capable of calculating results from materials placed in their hands to be operated upon. Old fogyism has very deep root, and young *daubers* in the *art* of open kettle sugar waste, spring from them, who say they only follow their sire's example and want still to perpetuate their rude destructive methods and systems. Very often these self-made or self-constituted individuals will destroy a large percentage of a crop, and yet they contend that nothing can be taught them in this most important business, which even the best chemists of all nationalties have not yet thoroughly fathomed to their own satisfaction.

About sugar makers we hear a great deal. One planter once said that they are all humbugs and utterly useless, because they do not understand or know their business, working altogether by routine and guessing. One sugar maker, speaking of himself, made the assertion, that he took off a sugar crop the first year he commenced learning it. Is it a wonder then, that opinions vary so much (and the quality, color and quantity of sugars are so different?) In one season, a man, if he is intelligent, will learn well the management of the apparatus. Can he conscientiously assert that in this one single season he is able to acquire all the knowledge of a sugar maker, to judge of all the changes of the cane juice and syrup and manipulate them accordingly! And suppose, with his presumptive title of sugar manufacturer, he does make some sugar, what losses will the planter sustain in the waste of his crystallizable sugar that goes into the molasses? This one year old sugar maker (rather precocious growth) will skim the juice; "boil" (evaporate) the juice; "boil" (condense) the syrup; "boil" (granulate) the sugar; and yet there is no clarification proper of this juice, no purification of the syrup and comparatively little crystallization of the crystallizable sugar; therefore the complaint from the planters when the yield is not satisfactory, if perchance the central factory or refining does not produce the highest percentage of crystallized sugars from syrups that have so much foreign substances in them in the shape of gums, that the stuff, when cooked, scarcely passes through the centrifugals,

though handled by our best, experienced sugar makers. There are few of these, as Mr. Giffen justly remarks. I saw the same competent sugar maker—the same week—when the canes were ripe all over the country, work such *stuff* with great trouble and disgust, and immediately after work syrups that yielded so much pure, crystallized sugar that there was barely enough pure, clean molasses in the sugar to run it to the drying machine.

Opinions on this subject have already been expressed. Quoting from the *Sugar-Bowl* of October 10th, 1878, I can say with the author of the article: "The plain practical man sneers at the idea of progress, he does not look around here, and does not see what is going on elsewhere, threatening his own existence. He knows as much as any person around him, he is satisfied, though his answer, to how much sugar is in my cane and what becomes of the sugar not accounted for is: I don't know. 'Practical' ignorance and lack of common sense will be death to the best interests of Louisiana yet, but she has been warned in time.

"The absolute 'practical' man here and there makes a discovery by accident; he has a few facts at his fingers' end which are as often erroneous as not. When he meets with a thing which differs somewhat from his usual routine (from what was done before us) he is of course wholly at the mercy of accidents, knowing nothing of the elements to deal with, he has no remedies. But real advancement—especially at the present time—comes from true enlightment. The sciences are not wild theories or speculation, but careful collections of facts, sifted by studious, hard, and means generally beyond the reach of, and often useless to, good men."

Apropos—from a French scientist: "It is the rule, in case of industries, to distinguish the learned (or man of genius) who invents and the industrial (or practical man) who executes, and as there is often an abyss between the theoretical discovery and the practical application, it is admitted that a distinct part should be accorded to the abstract inventor and the practical man who executes this invention."

This depends on genius and education. I contend that the "learned" or inventor can become "industrial" or practical. So that not only can he be the author of the invention, but can also "execute this invention," and for a still greater reason he can ensure its "practical application," better than any one else who would be less enlightened on its "theoretical" discovery.

Very often the sugar house and space or room for manipulating the juice and syrups, and handling the sugars, are not complete or wanting in due proportions in the different departments, though it may have the finest apparatus. For instance, a fine steam train may be used for sugar making, and not settling tanks for the deposits of the syrups, drawing the latter into the strike pan directly from the evaporators. And which is equally as bad, no cane juice boxes or "receivers" to give time for the juice to get free of the worst feculent matter and skum from the mill. Generally, notwithstanding settling tanks, there is a mixture of all syrups coming from the first cane juice and all that coming from the skimmings and settlings of the sugar house. I insist that there should be first and second syrups as there are first and second sugars. And let the second syrups (there is comparatively a small quantity of these) derived from the skum, drains and deposits of the whole establishment, be put separate in the second sugars, which would enhance the value of these, and our first sugars would greatly be improved in proportion—the massecuite being free from all causes of invention—by the absence of all the deleterious substances which must certainly exist in and be produced by scrapings,

washing, scrubbing and cleasing of juice boxes, clarifiers, tanks, strainers and filters. The causes of invertion of crystallizable sugars would then be removed from first sugars, and it would become easier to prepare the second syrups in separate tanks, even if more time were required. All that would be necessary is space, with very little additional labor, and this is done at the same time with the other work. Another advantage could be taken of this plan, by obtaining a good article of *third* sugars from the *second* molasses.

I have tried to impress this on the minds of certain parties who are intererested in the matter, but a rush through the grinding seems to be more important than the mere saving of sugar in quantity and quality.

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SUGAR CULTIVATION IN THE ARGENTINE REPUBLIC.

The following, on the subject of sugar cultivation in the Argentine Republic in South America, is from *The British Trade Journal* of August 1, 1883:

SANTIAGO DEL ESTERO, JUNE 10.

The enormous development of the sugar industry in the northern provinces of the Argentine Republic, and the field which it offers for the advantageous employment of English capital is worth the attention of your readers. There can be no question that sugar-growing is the department of agriculture here which has the greatest future before it. At present the Republic does not produce more than half enough to meet the home consumption, and it is obvious that there is ample scope for the further extension of the industry, if only to meet our own requirements, to say nothing about an export trade. Capitalists in this country are powerless to cope satisfactorily with the problem, owing to the fact that they are scattered all over the country. On the other hand, foreign capitalists whose efforts could be advantageously concentrated would find the industry a paying one. The lands most suited for sugar cultivation are in the provinces of Tucuman and Santiago del Estero, in the interior. They are both, however, connected with Buenos Ayres by a good service of trains, and by this means the dispatch of produce to the capital and the introduction of sugar machinery is rendered comparatively easy.

OFFICIAL ENCOURAGEMENT.

It must be admittted that former Governments have, in spite of political and other troubles, done all in their power to stimulate the industry, and for this purpose have not hesitated to draw on their scantily-supplied exchequer. In 1877, for instance, a law was passed providing that members of the Sugar Planters' Society should be exonerated for fifteen years from the payment of all municipal taxes then established or to come in force subsequently. Actuated by the same spirit, the Argentine Government has not only reduced the railway rates, but has declared that all machinery and implements destined for use in the cultivation and manufacture of sugar shall be introduced absolutely free of duty. There is a cosmopolitan society in Santiago composed of English, French, and German agriculturists, who work side-by-side with natives, Dutchmen, and others. The members of this body have, in the course of a few years,

raised themselves to positions of comfort and competency, and now receive that meed of respect and honor which the Argentines are ever ready to bestow on natives and foreigners alike who successfully breast the hill of life by hard and honest toil.

FACTS AND FIGURES.

That this letter may be of practical utility, I will give the cost of sowing and cultivating a sugar-cane *cuadra*, or plot, 150 yards square, for the first year, and the probable crop. These figures are exact, and can be verified by any of the diplomatic agents of the British Government:—

COST OF SOWING AND CULTIVATING SUGAR CANE PLOT 150 SQUARE YARDS.

Seed	$105
Labor	120
Keep of laborers	100
Cost of land	30
Drainage of plot	100
Cost and keep of 7 head of cattle	120
Cost of ploughs	55
Cartage of crop to factory	70
	700

CROP OF A PLOT 150 YARDS SQUARE.

7,000 arrobas of cane (about 78 tons) at $0.07 per arroba $490

These figures prove beyond doubt a clear return of 66 per cent. of the capital invested for the first year. In the following years the results would be far greater, as the main outlay has already been made. Mr. St. Germes, who may be called the parent of the industry in Santiago, is clearing 15 per cent. on capital invested in an estate which was offered to an English syndicate for 80,000*l.* last year. A return like this is not thought very much of here, where the ordinary bank rate is from 10 to 12 per cent. English capitalists seem unaware of the political status of countries like this. They are chary of an investment which cannot fail to produce certain and guaranteed results in fields that are full of wealth, yet will often advance millions to some petty State which is beyond hope of solvency. In conclusion I may add that considerable rivalry exists between the planters in several sugar-growing provinces, and in the so-called contests that have been held, subject to the decision of competent arbitrators, the palm has alternated from one to another. Santiago del Estero, however, is at present the holder of the coveted distinction.

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A NEW WORK ON SUGAR.

The *Louisiana Sugar Report*, 1882–83, makes the following note of a new Work on sugar:

"We acknowledge the receipt of a book entitled 'Sugar Growing and Refining,' published by E. & F. N. Spon, 44 Murray Street, New York. It contains a comprehensive treatise on the culture of sugar-yielding plants, and the manufacture, refining and analysis of cane and all sugar plants. It is the most complete work on these subjects in the English language, beautifully illustrated and printed. No planter's library should be without it. We take pleasure in recommending the work to all who take an interest in scientific books written by scientific men."

LOUISIANA SUGAR PLANTERS' ASSOCIATION.

The account of the annual meeting of the Louisiana Sugar Planters' Association is taken from the *Louisiana Sugar Report*, 1882-83, published by Alcee Bouchereau, 61 Camp street, New Orleans, La.:

The annual meeting of the Sugar Planters' Association was held March 9th, 1883, at 24 Baronne street, the President, Duncan F. Kenner, Esq., in the chair.

Upon motion of Mr. Richard McCall, the following officers were unanimously re-elected: Duncan F. Kenner, President; James F. Griffen, Secretary and Treasurer; John Dymond, First Vice-President; Henry Kernochan, Second Vice-President; J. W. Godbery, Jr., Third Vice-President; John Dymond, T. D. Miller, A Thomson, J. W. Godbery, Jr., Executive Committee; S. H. Kennedy, H. A. LeSassier, E. J. Gay, R. Milliken, Finance Committee.

Mr. John Dymond, chairman of the Executive Committee, presented the report of the committee for the past year, recounting its labors on behalf of the imperilled industry of Louisiana, with which our readers are already acquainted. It is largely due to the efforts of this committee that the new tariff now in operation is no worse than it is. We clip the following paragraphs showing the amount of protection the new rate affords to this great industry of this State:

Under the tariff as now passed, sugars hereafter imported, if they average the same saccharine strength as last year, will pay an average duty of two cents per pound. The tariff places 1 40-100 cent. per pound on all sugars or solutions of sugar testing not above 75 per cent. by the polariscope, and 4-100 cent. per degree for each degree or fraction of a degree above 85, until sugars above No. 13 are reached. Sugars above No. 13 and not above No. 16 pay 2½ cents per pound; above No. 16 and not above No. 20 pay 3 cents; and all above No. 20 pay 3½ cents.

On motion of Mr. McCall, amended by Mr. Wilkinson, the thanks of the Association were unanimously tendered Hon. Duncan F. Kenner, President, and member of the Tariff Commission, to our Senators and Representatives in Congress, and to the members of the committee sent to Washington in the interest of the sugar planters for their efforts in favor of said interest.

The Secretary read the following returns from leading plantations in the State:

	Tons Rolled....	Pounds Sugar Per Ton.....	Pounds massecuit per ton..	Per cent. sugar.	Per cent. of molasses.....	Per cent. massecuit.....	Acres of plant ground	Acres of plant cane, 1st year's stubble.....	Acres of plant cane 2d year's stubble.....	Average tons per acre.....
H. A. LeSassier.....	7,594	102.18	.....	5.01	4.00	9.01	193	90	.....	26.76
McCall Bros.....	19,100	106.00	192.00	5.30	4.30	9.60	405	235	.....	29.84
Emile Rost.....	9,288	121.10	171.98	6.10	2.95	9.05	....	.....	.....	22.30
J. W. Godbery, Jr..... ..	10,256	98.30	177.00	4.90	3.95	8.85	....	.....	....	23.60
John Dymond.....	24,398	107.00	163 00	5.35	2.80	8.15	....	.....	.....	.....
H. P. Kernochan.....	9,973	112.00	.... .	....	....	....	200	175	50	23.00
H. C. Warmoth.....	10,166	1.33	2.03	6.05	3.54	10.19	404	89	15	20.20
G. and J. Kock.....	18,383	106.91	175.72	5.34	3.44	8.78	....	.....	.....	28.37
R. Viterbo.....	14,707	1.24	.....	6.20	2.30	8.50	....	.....	.....	24.07

At the monthly meeting, May 10th, the Secretary read a communica-

tion from Mr. A. S. Wheeler in reference to an improvement in sugar machinery.

Mr. John S. Wallis read an interesting paper on "Syrup and its Transportation to Market;" and on motion of Mr. Dymond the thanks of the Association were tendered to Mr. Wallis for the same.

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THE TREATY.

The *Louisiana Sugar Report* for 1882-83 contains the following remarks on the cargoes of sugar shipped from Honolulu to New York, and comments on the Hawaiian Treaty:

"A new feature in the trade has been the direct importation at New York of several cargoes from the Sandwich Islands under the terms of the existing reciprocity treaty with that Kingdom, admitting sugar free. The Customs authorities at first sought to impose duty upon these importations, claiming that the quality was superior to that defined in the treaty, but after several references to the Treasury Department, it was finally decided that the cargoes came within the provisions of the treaty, and were accordingly exempt. The question of the abrogation of this treaty has been a prominent subject for discussion throughout the year, and as the specified time for giving the necessary notice will expire in September, 1883, some action will have to be taken by the present Congress either *pro* or *con*. The operation of the treaty has stimulated the cultivation of sugar upon the Islands, the crop having increased about eight fold in the space of seven years during which time the treaty has been in force; while it has furthermore resulted in the building up of a large industry on the Pacific coast for refining the raw material so largely imported from the Islands, which is capable of more than supplying the requirements of that section generally termed the Pacific slope. This has deprived Eastern refiners of an important market for their product, and they accordingly favor the abrogation of the treaty, while the over-protected sugar industry of the South, which is so heavily subsidized at the expense of consumers, cries aloud that her interests are being sacrificed by the continuance of such a treaty. Aside, however, from these considerations, which are worthy of attention on both sides, it appears there are important diplomatic reasons that would make it unwise to change or abrogate the existing treaty, which, after all, is not working the injury that some would make appear."

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LOUISIANA SUGAR STATISTICS.

The *Louisiana Sugar Report*, 1882–83, contains the following statement in regard to the State of Louisiana:

"The number of sugar houses in operation in 1882 was 910, of which 743 used steam and 167 horse-power. In 1880 there were 1144, of which 871 used steam and 273 horse-power, showing a decrease in the number of sugar houses in operation in 1882 of 234. In 1881 many plantations did not grind, keeping all their cane for seed, consequently we use the figures of 1880, that being the next largest crop with free labor.

Of the sugar houses in operation in 1882–83, 116 produced 90,927 hogsheads of clarified sugar of 1st and 2d, weighing 118,205,868 pounds, and 794 produced 150,293 hogsheads of brown sngar, weighing 184,860,290 pounds.

The average number of gallons of molasses was much less than usual, 36 gallons per 1000 pounds for refined sugar or 4,255,411 gallons, and 62 gallons per 1000 for brown sugar, or 11,461,344 gallons.

The actual average net weight of the hogshead last season, as obtained from the public weigher in the city, was: Refined sugars 1,300 pounds, brown 1,230 pounds, clarified in barrels 300 pounds, or 4½ barrels to the hogshead. The average gauge of molasses was 47 gallons to the barrel. Average weight of clean rice was 230 pounds to the barrel. We have applied the above average in estimating the total of the crop in pounds and in gallons of molasses. To crops reported in pounds, where we could not ascertain the number of hogsheads filled, we have applied the weights of last year.

In registering the crops of the plantations which boiled their cane juice into syrup, and shipped elsewhere to be granulated, we have allowed five (5) barrels of syrup per hogshead, that being a fair average.

There were 120,555 acres of cane ground last season, which is 25,523 acres more than the previous year. Planters using the vacuum pan obtained an average of 2,782 pounds per acre, and those using other apparatus 2,368 pounds per acre.

The average yield of sugar per ton of cane obtained by planters using the vacuum pan was 115 pounds.

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— The Hawaiian Commercial Company has ordered, or is about to order, another set of steam plows. Where plowing by steam can be performed conveniently the results are much superior to plowing with animal power. The thorough preparation of the soil obtained tends to produce much better crops than plowing by other means.

— Among other improvements going on in the sugar house on the Petite Anse Island plantation of the Messrs. Avery, in Iberia parish, is the putting up of an additional three-roller mill, the rolls being 30 inches diameter by 36 in length, both mills being run by the same engine with double gearing.—*Sugar Bowl*, August 23, 1883.

— Much attention is being given by some of our planters to investigations on the subject of the "diffusion" process of extracting cane juice. It is the process most commonly used now for extracting the juice of the beet root. The plan is to slice the material, from which the juice is to be taken, into strips, and by water and heat extract the juice.

— Sugar is not an exhaustive substance, for its component parts are such as to cause no demand on the soil. This fact perhaps is not generally known, but when we consider that sugar and glucose are composed of carbon, oxygen and hydrogen, the first of which is derived from the air, the latter two from water, it may be said to be produced from the most plentiful of all substances.—*Sugar Bowl.*

COMMUNICATIONS.

THE PLANTER SHOULD SUPPORT GOOD SCHOOLS.

EDITOR PLANTERS' MONTHLY: The following appropriate remarks, are copied from an editorial article in the PLANTERS' MONTHLY, for September:

"A good school in which all the children are gathered under the guiding and quickening mind of a noble teacher, drawing out good purposes, repressing and shaming evil instincts and developing alike the higher moral and mental powers of the youth—such a school re-acts powerfully on the whole community through these youths in their homes and contributes to give a high moral tone."

These remarks are excellent, but do the owners of plantations, or their superintendants, as a general thing, encourage the school teacher? Do they co-operate with the Superintendant of the Board of Education in his efforts to keep the schools full? Is it not lamentably true, that in many cases, children are "shipped" to work on plantations, prior to the age allowed by the law? Suppose a police officer should look around on many plantations, would he not find many a boy "shipped," who ought to be in school?

Considering the fact that there is a great scarcity of labor on many plantations, it is not strange, that boys and even girls, are allowed to "ship," who ought to be in the school house. Another reason why there is too much laxity upon this subject, may be that the planter is not taxed for the support of schools, beyond his "2 dollars per annum tax," which is paid by the poor kanaka, as well as the richest planter.

This whole subject of schooling needs a thorough review and re-adjustment. The laws relating to education in this island kingdom, are unlike the laws of most civilized lands. Here, property owners are not taxed for building of school-houses, and supporting teachers. This tax falls upon individuals, alike, whether rich or poor, hence the poorest Chinaman pays for public schools as much as the richest planter. When we come to speak of nationalities supporting schools, is it not true, that the Chinese pay a larger amount for the support of public schools, than any other nationality in this kingdom?

In view of this fact, could not some method be devised by which adult Chinese, willing to learn the English language, could be provided with suitable teachers, at the expense or partial expense of the Board of Education? Would not English schools among the Chinese adults scattered over the Islands be productive of immense good? Missionary and philanthrophic effort may accomplish much good, in this department of education, but they are insufficient to meet the desired results. Let planters interest themselves in this way, and it is believed they would discover that their best interests were promoted. The moral tone among their laborers would be elevated. How much better to assemble Chinese adult laborers for a lesson in Webster's Spelling Book

than to have them gather for gambling and other vicious practices. quote another remark from the same article as abovementioned:

"One of the great sources of loss on most plantations is from laborers, and lunas as well, made negligent and unreliable by drunkenness and disorderly conduct." The writer then proceeds to say that no one more than the planter is bound to use his utmost influence for the "promotion of such morals and a pnre and intelligent public sentiment."

Aside from the school question, if the planter would consult his own interests, it is believed that he could not employ any more salutary and effectual method of usefulness among his labors than by establishing a good reading room on his plantation, for the benefit of his laborers. Let him distribute German, Portuguese, English, and Chinese newspapers among his laborers. A few dollars, expended in this way, would contribute most essentially to the welfare and good feeling among his laborers. Give them good illustrated papers, to con over in their quarters, and paste up on the ceilings of their humble dwellings. Rest assured that a few dollars expended monthly in this way would be productive of great good. SAM. C. DAMON.

THE CANE BORER.

EDITOR PLANTERS' MONTHLY: Anent your article on the cane borer in the August number of the MONTHLY. I have never taken much stock in burning off as a preventive, for these reasons: In the first place, the eggs of the beetle, or matured cane borer, are laid in an almost imperceptible puncture or bored hole beneath the rind of the cane, and always above the surface of the ground, never below; and these with the *larvæ*, are effectually disposed of in the process of crushing at the mill. The matured egg *larvæ*, although slow of wing, having been disturbed by the cutting of the cane, will have found its way to other fields. Whatever borers there may be in the remaining stumps of cane will generally be too deeply ensconced to be seriously affected by the rapidly passing fire. It is natural to suppose that there are seasons of the year when the matured insects are specially numerous, and if this should happen to be when the ripened cane is to be cut, a fire flashed through the standing cane would be very effective in destroying them. I have examined young cane when it was ready for the first stripping, when two to eight of the matured borers could be found behind the butt of nearly every dried or loosened leaf; and the desire at such a time, to wreak vengeance on the enemy by burning, is very strong, but I fancy that planters rich enough to feel that they can afford such a sacrifice of cane, are scarce. As to the questionable benefit derived from burning off the trash after cutting a field of cane, I have repeatedly noticed that where the plant cane was but slightly affected by the borer, the following ratoons, after burning, were quite badly affected. Whether this could be traced as a direct result of burning—the residue and odors of the fire remaining in the soil long after, being attractive to the insect—is more than I know; but this would scarcely seem to be the true explanation.

As we are all after the truth, any estabiished facts or observations contrary to the foregoing, are respectfully invited to be made known through the pages of the PLANTERS' MONTHLY. A PLANTER.

ITEMS.

— The Annual meeting of the Planters' Labor and Supply Company is to convene at Honolulu, October 15th, at 10 A. M.

— Copious rains in the District of Kona, Hawaii, this summer, have clothed the country with verdure.

— Considerable rain fell in the district of Kau during August and September, and was of great benefit to the crops.

— Mosquitoes are accused by Prof. A. F. A. King of originating and disseminating malarial disease.—*Scientific American.*

— The *Sugar Bowl* of August 30, publishes the communication on the "Use of Exhaust Steam" by H. C. Austin, which appeared in the June number of this Journal.

— The *Scientific American* mentioning the use of the Jarvis Patent Furnace at these Islands, states that they have just been put in on the *Waulukulu Plantation*, Island of *Monia!*

— The new wharf at Honuapo, Kau, is of great value to all shippers in that neighborhood. Where formerly much risk attended shipping sugar and other freight, now it is accomplished safely.

— The capital invested in the sugar industry in the State of Louisiana is estimated at a hundred million dollars. The machinery alone is valued at ten millions.

— A few mungoos were imported from the Colonies by Mr. Purvis, last month. The result of the experiment will be watched with interest by planters. Whether the animal will prove more of a curse than a blessing remains to be seen.

— The Jarvis Patent Furnace tried at the Wailuku Plantation last season produced such good results, that the Company has had all of the boilers set with these furnaces. Waikapu, Waihee, Onomea, Paukaa, and other plantations have introduced them.

— During the past month the trash houses of the Haiku Plantation on Maui, and Kaneohe Plantation on Oahu, were destroyed by fire. Both are believed to have been fired by incendaries. The loss at Haiku is estimated at $3000, and at Kaneohe at $2000.

— Mr. T. G. Thrum has just received a few copies of a work entitled *The Sugar Cane in Australia*, by Angus Mackay. It was published at the office of the *Town and Country Journal*, Pitt Street, Sydney, this year, and is a new edition of a work of similar title. From a cursory examination of the book we should judge it to be a valuable work for planters. We will endeavor to make a brief review of it in another number.

SELECTIONS.

TEXT OF THE NEW TARIFF LAW.

The following is the text of the new tariff law in regard to sugar:

All sugars not above No. 13 Dutch standard in color, shall pay duty on their polariscopic test as follows, viz.:

All sugars not above No. 13 Dutch standard in color, all tank bottoms, sirups of cane juice or of beet juice, melada, concentrated melada, concrete and concentrated molasses, testing by the polariscope not above seventy-five degrees, shall pay a duty of one and forty-hundredths cent per pound, and for every additional degree or fraction of a degree shown by the polariscope test, they pay four-hundredths of a cent per pound additional.

All sugars above No. 13 Dutch standard in color, shall be classified by the Dutch standard of color, and pay duty as follows, namely:

All sugars above No. 13 and not above No. 16 Dutch standard, two and seventy-five hundredths cents per pound.

All sugars above No. 16 and not above No. 20 Dutch standard, three cents per pound.

All sugars above No. 20 Dutch standard, three and fifty-hundredths cents per pound.

Molasses testing not above fifty-six degrees by the polariscope, shall pay a duty of four cents per gallon; molasses testing above fifty six degrees, shall pay a duty of eight cents per gallon.

Sugar candy, not colored, five cents per pound.

All other confectionery, not specially enumerated or provided for in this Act, made wholly or in part of sugar, and not on sugars after being refined, when tinctured, colored or in any way adultered, valued at thirty cents per pound.

Confectionery valued above thirty cents per pounds, or when sold by the box, package or otherwise than by the pound, fifty per centum ad valorem.

Mr. J. F. Giffen, secretary of the Sugar Planters' Association, furnishes the following in reference to the application of the new law:

Our open kettle sugar varies in the per cent. of crystallizable sugar from 80 to 90. The test is very seldom below 80, and sometimes above 90—as is often the case in the prairie sugars of the Attakapas—such sugars as H. Patout & Bros. and Patout & Bouvillain's, polarizing as high as 92.5. A fair average of the test of our *open kettle sugars* would be 85.

Our seconds (vacuum pan) polarize usually about 92—not higher than some of our choice open kettles—these seconds being colored sugars that grade below No. 13 Dutch standard. The color of a sugar is not a test of its strength, as some of our Attakapas sugars (open kettle) which test so very high are often deep in color though *very dry* —*i. e.*, cooked high and well drained before they get to market.

Beginning, at 1.40 for 75 test, as does the new tariff, and adding .04 for every additional degree of saccharine strength up to 90°, the accepted basis of No. 13 D. S., our Louisiana open kettle sugars would be protected in proportion to their strength, and at 90° would have a protection of 2 cents per pound, and the sugar of 85 test would have the benefit of a duty of 1-88 cents per pound.

In nearly every case of test, I have rarely found Louisiana sugars *well drained*, testing below 85°, though in very low and *badly purged* sugars it will go below 80°. It takes very green cane and a very

poor sugar maker to put sugar on our market below that test, and it is *an exception* to meet with any sugar as low as 75°, the initial point of polariscopic test in the new tariff.

The fraction reduction of ½ cent per pound in grades up to No. 13 D. S. is greatly compensated by the protection against fraudulent importations by the polariscopic test which will tend to counterbalance the effect in our markets.—*Boucherau's Louisiana Sugar Report*, 1882–83.

INDIAN LABOR.—The following from the *Australian Sugar Planter*, is of interest concerning the method of obtaining Indian laborers.

"As this question does not seem to be very well understood, the *Melbourne Argus* obtained from Mr. J. Harward de Rinzy, the agent of the Indian Government for these colonies, the following statement on the subject:—

"Coolies are recruited by the thousand every year for service in Trinidad, the Mauritus, Demarara, Cuba, &c. The Indian Government first of all issue a proclamation that recruits are wanted. Recruiting officers are then appointed from the half-caste population, men of a superior stamp to the ordinary natives, and the recruits have to satisfy these Government officers of their honesty and integrity. The officers have also to see that they are up to the standard of chest measurement, within the limits of age, and as far as they can judge, healthy. After matters are explained to the recruits, they are brought into the towns, where they have to pass a medical examination, and then they are taken to the magistrate of the district in gangs. The magistrate, who is likewise a Government officer, reads out to them a Government order permitting them to leave the country, and tells them where they are going, how many years they are to serve, and the amount of remuneration they are to receive, arranges about their advances, and draws up a legal contract for each man. The men are then sent by rail to the port of embarkation, which may be Calcutta, Madras, or Bombay. There they are housed in the serals, or travellers' quarters, until their ship is ready to sail. When everything is ready they are required to sign their own indentures, and until they do so they are quite at liberty to change their minds and return home. After they have signed, and have been shipped, they have to pass through another medical inspection, and the ship's stores are overhauled. On arriving at the end of their voyage they are told off by the local Indian Government officer amongst the various employers, in accordance with previous arrangement. The Indian Emigration Act does not apply to Victoria or to any of the Australian colonies, and no Indian labor can be legally exported to these colonies except through Messrs. James Saunders & Co., of which firm I am the senior partner, and even then it can only be done by special permit and for a special purpose. We are the agents here for the Government of India.

THE ECKMAN-FRY ESPEUT SUGAR PROCESS.—Experiments are still in progress with a view to ascertain the best boiler or cylinder, both as regards form and material, for the the carrying out of this process, the details of which we published in our July number. It is believed that with the best plant and by experienced operatives, results might be obtained even more satisfactory than those we have already announced. The manufacturer of sugar machinery has now to apply to the chemist to assist in finding the metal best able to resist the action of the chemicals employed in the cylinders, and also the effect of heat and moisture. Several manufacturers of sugar-making plant are engaged upon the problem, and

drawings are ready in some cases according to which the engineers are prepared to construct the cylinders. A German firm are already in the field, and their plan is now undergoing trial in this country; while in Jamaica the experiment is being tried on a large scale with plant existing there of the simplest possible description. For the manufacture of the necessary chemicals machinery will also be required, and regarding this an inventor in the Uunited States is already active. As yet, however, no patents have been taken out, either for this class of machinery or for the cylinders. Manufacturers here have, therefore, an opportunity to display their skill and ingenuity which we trust they will not lose. It would be a matter for no little regret if it became necessary, or even possible, to obtain the valuable and extensive plant which will be required for the new process from the Continent or America rather than from Great Britain.

With reference to the inquiries forwarded to us as to the machinery which will be required for cutting up the canes there remains little to add to the particulars already given. When the process is taken in hand by the planters it will be found that very few, if any of existing chaff-cutters, are large enough to cut at the rate necessary. Practical experience with them on a small scale suggests also a modification in the shape of the blades. The outer coat of the sugar cane contains a silica which soon injures the edges made for cutting chaff. A stouter blade, one side of which may remain unground, while the other is ground like a joiner's chisel a distance of about 1½ inch from the bottom would be more like the cutting blade required.—*British Trade Journal.*

THE PREVENTION OF ACCIDENTS.—Many of the accidents to limb and life by machinery occur from carelessness—the carelessness that comes from ignorance, or the carelessness that comes from familiar knowledge. Persons unfamiliar with the remorseless exactness of machinery seem to imagine that it can be played with, or tampered with, or that it will relax its awful and irresistible force on appeal. These are they who should be protected while among machinery. And for their benefit as well as that of the daily operatives, almost all the machinery now constructed, that may be approached, is defended by simple devices. Trains of gears are not now left exposed, nor are belts and pulleys open to the injudicious curiosity of the visitor. Yet safeguards are almost as necessary for the mechanic, the operative, and the manager as for the inexperienced curiosity seeker. The proprietor of a sawing and planing establishment, while "ripping up" some furring cut off a finger. When he returned he cut off two others, all within a month. He was careless from familiarity. Another, an intelligent mechanic, undertook to show some visiting friends the uses of the buzz saw, and was trying to explain to them the reason why the toothed portion of the saw was invisible while in motion, when he lost a finger by not giving his imaginary invisible radius of the saw a proper and respectful distance. Guards to circular saws and to revolving pulleys and rapid belts and grinding gears are possible, and if not made by the builders of machinery, or placed by the users of machinery, they should be enforced by the law, as a protection to the ignorant and the familiar, for the visitor and the operator.—*Scientific American.*

REMOVING LARGE STUMPS.—I see that there is some discussion about pulling stumps. Having a very large experience in clearing very large stumps from a field, I will tell you my way. I use dynamite cartridges, or giant powder. It

is put up in cartridges about 8 inches long and 1¼ to 1½ inches in diameter. I use an iron bar a trifle larger than the cartridge, to make a hole under the very centre of the stump, between the two largest roots. Having made the hole, if the stump is a large one, I insert a whole cartridge, having first put a percussion cap on the end of the fuse, (caps made for the purpose,) and pinch it a little, so the fuse will not draw out of the cap. I make a hole in the cartridge with a small stick just the size of the cap, then insert the cap, and then carefully pass the cartridge into the hole under the stump, and leave fuse enough to permit me to get a good distance away. For smaller stumps half a cartridge will answer.

If it does not blow out the whole stump, it will quarter it, so that a team will very easily draw out the pieces, roots and all, making it a good deal easier to break up with the plow. I never try to use a cartridge when it is frozen, and it freezes at 30°. A good way to thaw them out is to put them into a tin pail and put the pail into some hot water. I never pound or stamp it too hard, as it might explode from the concussion. Otherwise it is safer than gunpowder.—H. A. Cook, in *Country Gentleman.*

THE LATHE.—The oldest machine tool known is the most valuable. It contains the germs of all others, whether rotary or reciprocating, and can be made to take the place and the work of any one of them at a time, and all of them as desired. Its origin is lost in the mist of prehistoric times. It is as old as the loom, and was used by the oldest nations. As constructed in these times, it has reached great perfection, and is made in various special forms; there are boring and chucking lathes, turning lathes, screw cutting lathes, drilling lathes, and polishing lathes. But a screw cutting lathe with rack or friction feed, and the other appliances of a complete lathe, comprehend in its capabilities almost all the offices of the other special tools used in the machine shop.

Take a single instance of its capabilities, the production of a screw tap. The lathe will cut a piece from the steel bar; it will drill its centers and countersink them; turn the tap whether straight or taper; cut the thread on it; score the tap, either by a cutter in the tool post while the tap is suspended on the centers of the spindles, or by means of a rotary cutter or milling tool on the spindle centers while the tap is held on temporary centers on the tool carriage. Even the top end of the tap can be squared, by similar means, for the reception of the tap wrench.

Now, all this work represents the cutting-off machine, the drilling lathe, the turning lathe, the screw-cutting lathe, the planer, or the milling machine. And unlike many combination tools, the lathe can be made to do all this work well.

With a cheap attachment the late can be made to cut gears, making the teeth with practical accuracy, and the lathe itself can be used to produce the index plate that insures this accuracy. A job of planing, or surfacing, where the work will swing in the lathe, can frequently be better and quicker done on the lathe chuck than on the planer platen. The rapidity is much greater because the surface to be worked is continually under the action of the tool, instead of having more than one-third of the time wasted in the running back of the platen for the return chip.

In short, all the other machine tools, either of a rotary or reciprocating character, are simply modifications of the lathe; and with the lathe and its convenient appliances and necessary tools, the mechanic can by the exercise of his taste and skill perform almost any ordinary job in the working of metals pos-

sible on machine tools. The possession of a screw-cutting slide-rest foot lathe and a common bench vise, with their accompanying hand tools, is an excellent outfit for the amateur. *Scientific American.*

COOLIE LABOR IN CUBA.—It is stated arrangements have been made between Brazil and China for the introduction into the former country of 20,000 Chinese indentured laborers. It is estimated that they can be landed at Rio for a little more than £2 per head, and it appears that they are to receive wages at the rate of 17d. per diem, and to provide their own food. They will therefore cost less than negro slave labor, upon which the Brazilians have hitherto relied. The correspondent states that no guarantees are given for the fair treatment of the Chinese. In the interior of Brazil there is a total absence of any judicial machinery for the protection of the laboring class, and the Chinese possess no diplomatic or consular authority to secure redress for their grievances. It is said that the laborers are not to have passports like other foreigners; that they will be prohibited from living in the towns, the intention being to employ them in coffee planting; and that they will be compelled to make their purchases in the truck shops, which are almost invariably owned by the planters. It is furstated that the ultimate importation into Brazil of from 400,000 to 500,000 Chinese is anticipated.

JAPAN SUGAR.—The sugar of Japan, says Consul-General Van Buren, is made from that species of the sorghum plant known as the Chinese sorghum. It grows luxuriantly in all the southern portions of the empire south of the 36th degree of north latitude. The whole product of the empire in 1878 was 64,297,580 lbs. Importation in 1878 was 67,434,805 lbs. For three or four hundred years the processes of granulating and refining sugars have been known and practised. Sorghum is not grown, as with us, from the seed, but from cuttings. In September, selected stalks are buried in trenches a foot deep. Through the winter, from each joint of the stalk sprouts grow. In the spring these points are cut off and set out in rows from 15 to 18 inches apart, and about the same distance from each other in the rows. The ground has previously been thoroughly dug up, and pulverized by a long-bladed mattack. The fertilizers used are ashes, fish, decomposed hay, straw and seaweed or night soil. The plants are thoroughly hoed, hilled and irrigated. In October and November the leaves are stripped off, and the stalks are then cut and the outer covering is removed, and the remaining portion is then ground between rollers of stone or hard wood. The cane juice is then boiled in iron kettles till the granulation takes place, when it is placed in bags and pressed dry. The expressed syrup is used as molasses. Dry upland soils are required for the successful growth of the cane, and the expenditure of labor and fertilizers is as great if not greater than for any other crop. Great exertions are being made to promote the increased production of sugar, which will probably be in some degree successful. In fact, I am informed that large orders for the apparatus for sugar-making have been received from districts which heretofore have not grown sugar cane.