THE

Fibre Bearing Plants

OF

FLORIDA.

BEING A DESCRIPTION OF

THE AGAVA SISALANA SANSIVIERIA, BROMELIA SYLVESTRIS, PINEAPPLE, URENA LOBATA AND RAMIE PLANTS. TOGETHER WITH METHODS OF PROPAGATION, CULTIVATION AND EXTRACTION OF THE FIBRES.

BY

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The Associated Railway Land Department of Florida, under whose auspices this treatise is published, would call the attention of those who may become interested, to the fact that we own and control large bodies of land in Florida, peculiary adapted and well located for the growing of fibre plants.

For maps, plats, prices and terms, address,

D. H. ELLIOTT, General Land Agent.

Sanford, Florida.

Nursery of Sisal Hemp Plants in South Florida.

The Fibre Bearing Plants

OF

FLORIDA.

INTRODUCTION.

The fibre-bearing plants capable of successful and profitable cultivation in the State of Florida are in great variety, and comprise nearly all the fibres, or a substitute for them, now imported into the United States, which amount, in round numbers, to $50,000,000 annually.

The United States is now a larger consumer of long fibres for handling the cotton crop and its products than all the rest of the world.

The United States is a larger consumer of long fibre for handling the grain crop and its products than all the world together.

The United States is the largest consumer of long fibre (in twine) for harvesting the grain crop than all the other countries of the globe.

The conditions of soil, temperature, humidity and regular supply of moisture in Florida, fully warrant the growing of the plants, producing these fibres, in a higher degree of perfection than any other country on the globe where they are now cultivated. The cultivation of these plants and repeated experiments made with them in Florida, with some embracing a period of nearly sixty years, fully warrant this assertion.

The annual importations of wool and its manufactures into this country amounts to over $60,000,000, while of silk and silk goods about $20,000,000 worth are imported each year.

A plant that grows luxuriantly in Florida, produces a beautiful, fine fibre, that will largely take the place of both wool and silk, and used as an admixture with them, add materially to the value and elegance of the textiles now made from them.

Of flax and its manufactures over $20,000,000 worth are annually imported into the United States. Fibres in every way superior to flax, and that will entirely substitute it in all its manufactures, can be produced in Florida at less than one-half the cost of producing flax, and in the opinion of competent authorities, when the extensive cultivation of these fibres shall be taken up, they will entirely supplant flax and stop its cultivation.

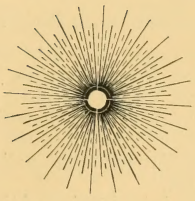
The question naturally arises: If Florida is the perfect habitat of fibre-bearing plants in such great variety, and they can be so successfully grown, why has an industry of such vital importance to the State and the country at large been so long neglected?

The reason is obvious. The want of successful decorticating machinery to extract the fibre from the plants at a cost to compete with the cheap labor employed in the great fibre-producing countries of the world. To produce such machinery has for years baffled the inventor's skill, and it is only within a comparatively recent date that this important problem has been thoroughly solved. Efficient and successful machinery is now available, that produces fibre in the most perfect and finished condition, from the agaves and allied species of leaf fibre-bearing plants, and at a minimum cost, decorticaters and processes have also been devised that inexpensively produce the wonderful ramie fibre.

With this improved machinery and the intelligent labor that would be employed, Florida can now successfully compete with India, Mauritius, the Phillipine Islands, China and Yucatan in the production of fibres.

The farmers of Florida have now the option of adding other profitable crops to the long list of those being cultivated in the State. The prospective immigrant, seeking a more genial clime in which to prosecute his husbandry, has the assurance that the cultivation of fibre plants will be found not only profitable, but attended with less difficulties and anxiety, than the crops of a more rigorous latitude. While to the capitalist seeking for large investments, the production of fibres in Florida offers unexceptionable inducements for the profitable investment of capital. A careful investigation into all the details of the industry will convince the most skeptical that the business must prove highly remunerative and satisfactory.

It is the purpose of this pamphlet to consider in the following pages the different fibre plants susceptible of profitable cultivation in Florida, under different heads, in as brief and explicit a manner as possible, giving a description of the plants, methods of propagation, cultivation and extraction of the fibres, together with descriptions of decorticating machinery and notes regarding the fibre industry in other countries.



FLORIDA HEMP.

OR AGAVE RIGIDA VAR. SISALANA.

A better and more extended knowledge prevails regarding the above leaf fibre plant than any other growing in Florida, for the reason that it has been growing in the State for a longer duration of time, and more has been said and written in relation to it.

This plant is commonly known as the Sisal Hemp plant, and also as Henequen, which is the Mexican term for it. It is found growing in nearly every part of Peninsular Florida south of the 29th degree of latitude, and frequently matures and "poles" as far north as Jacksonville.

INTRODUCTION INTO FLORIDA.

This plant was introduced into Florida in the years 1836 and 1837, by Dr. Henry Perrine, and to this peculiar species of the Agave Rigida he gave the name Sisalana. Dr. Perrine had been American Consul at Campeachy and had obtained a grant of land from the United States Government on Biscayne Bay for introduction of tropical plants into the United States.

At the time of the introduction of the plant into Florida, the Seminole Indian War was raging, and Dr. Perrine placed the plants on Indian and Metacombe Keys, in nursery form, intending, when hostilities should cease and peace become restored, to transfer them to his grant on Biscayne Bay. He was not, however, permitted to carry his designs into execution, for the Indians invaded the Keys and he was slain in August, 1840, in the historical Indian Key massacre. The plants, however, have survived and multiplied abundantly, and are now found growing on nearly all the Florida Keys and many parts of the main land, in a wild, uncultivated state, in dense impenetrable thickets.

CULTIVATION ALREADY BEGUN.

The cultivation of the plant has been taken up to a limited extent in several places in Florida. At Jupiter, on Indian River, and near Juno, at the north end of Lake Worth, are several tracts of fine plants in cultivation. At New River is a plantation with some fifty acres in cultivation. On Boca Chica Key, Mr. Geo. H. Bier, of Key West,

has a fine plantation of considerable extent. In 1887-'89 the industry received some impetus through Mr. D. P. Burdon, who had invented a machine for the decortication of the fibre, and several tracts were placed in cultivation in Orange County, but Mr. Burdon's invention not proving an entire success, the enterprise was abandoned. Enough has been done in the line, however, to demonstrate this fact, that the plant thrives, when cultivated in Florida, in a higher degree of perfection and luxuriance than elsewhere in the world where cultivated.

YUCATAN ONLY SOURCE OF SUPPLY.

Yucatan has, for a long term of years, supplied the world with its fibre from the leaves of the Agave Rigida, the sisal hemp of commerce, and its production has become a great source of wealth to that country. The United States, being the largest consumer of this variety of hemp, purchases over 80 per cent. of the entire production of Yucatan, amounting in some years to 35,000 tons.

So jealously has Yucatan guarded its hemp industry, that a stringent prohibitory law exists against the exportation of plants from that country.

SUPERIORITY OF FLORIDA HEMP OVER THAT OF YUCATAN.

The Sisal plant, as cultivated in Yucatan, differs materially from that found growing in Florida. In the former country the leaves are armed with sharp spines on the edge, while the Florida variety is smooth. Yucatan hemp is rarely seen over three feet in length, is coarse in texture and of a dingy yellow appearance, while Florida hemp will easily average 4½ feet in length, is much finer, perfectly white and possesses far greater strength.

HEMP INDUSTRY IN THE BAHAMAS.

During the past six years the cultivation of Sisal Hemp has been extensively taken up in the Bahama Islands, and through the heroic exertions of Sir Ambrose Shea, Governor of the Colony, the industry has assumed large proportions, and many thousand acres are now in cultivation. English capital, which is proverbially quick to discover every opportunity for profitable investment, has been largely directed into this industry; and in this connection it is a significant fact, that the Right Honorable Joseph Chamberlain, one of the leaders in the British Parliament, has 5,000 acres under successful cultivation in Sisal Hemp in the Island of Andros, the largest of the group, and he and his sons are now preparing to take up and cultivate 5,000 acres more.

The production of hemp is now the chief industry of the Bahamas, and it bids fair to be many times greater. The Bahamians are indebted to Florida for their ability to take up the cultivation of the Agave Sisalana, for it was from this State they were enabled to procure their plants, which could have been obtained from no other source, and the name, Sisal Hemp, as given to fibre from plants having their origin in Florida, is a misnomer. Respecting this, there appears in United States Department of Agriculture Fibre Report No. 5, the following:

"If regard be had to strict accuracy, the name Florida Hemp should be given to the smooth-leaved variety grown in the Bahamas, and also in Florida, as the larger proportion of the plants now growing on the Bahamian Islands were brought from Florida by the schooner load in very recent years."

The Bahamian Government also has a prohibitory law against the exportation of plants from that Colony.

FLORIDA THE ONLY SOURCE OF SUPPLY FOR PLANTS.

Mr. Geo. H. Bier, of Key West, has shipped large quantities of plants to Honolulu, Hawaii, and when the political state of that country shall have become more settled, is to ship many more. Orders have been recently received for plants from the Fiji Islands, and also from Calcutta. From all this, it would appear that Florida is the only source of supply for plants of the Agave Sisalana for the whole universe, and the conditions may seem peculiar that this State is not producing any of the fibre.

SOIL.

The Agave Sisalana will grow and thrive in nearly every variety of Florida soils, and the idea is advanced by many that the poorest of soils is best adapted to the cultivation of the plant for fibre, for while a more rapid growth of leaves might be obtained in a rich soil, the percentage of fibre would be less. A large proportion of the lands in cultivation in the Bahamas are worn out pineapple lands, that had become exhausted and incapable of producing profitable crops of that fruit. The lands on which Sisal Hemp is cultivated in Yucatan are sterile rocky barrens, on which probably no other crop could be grown with profit. In commenting on this question of soils, Mr. Chas. Richards Dodge has the following, on page 21 of United States Department of Agriculture Fibre Report No. 5:

"I should say that from all I have been able to learn there are thousands of acres of better Sisal Hemp land in South Florida than in the fibre-producing district of Yucatan."

The Agave Sisalana is largely an air plant, and derives its sustenance from the atmosphere in the form of bacteria, as with luguminous plants, cowpeas, peanuts, etc. This, no doubt, explains why the plant is capable of producing such an enormous yield of leaves in a barren soil without fertilization.

LIFE OF THE PLANT AND PROPAGATION.

The life of the plant in Florida, when allowed to grow undisturbed, without any cutting of the leaves, has been found to be about seven years, when it "poles," flowers, puts out 2,000 or more minute plants, known as "pole plants," and dies. These tiny plants are very tenacious of life, and when sufficiently matured, drop from the stalk or pole to the ground, and readily root and grow. The principal and best method of propagating the Agave Sisalana is by pole plants. Suckers, which are constantly starting up from the roots of old plants, is another source of supply for plants.

PROFITABLE YIELDING LIFE OF THE PLANT.

The profitable yielding life of the plant in Yucatan is from 15 to 20 years. The leaves attain a sufficient length to cut for fibre after the third year. The leaves are constantly unfolding and are cut each month in the year, and afford a perpetual crop. On large plantations the production of fibre never ceases, but is carried on every day of the year. The leaves can be cut, the fibre extracted and placed in the bale the same day.

Cutting the leaves of the plant retards the poling and prolongs the life of the plant. It is presumably the conditions that exist in Yucatan are equally applicable to Florida, and the yielding life of the plant would be the same in both countries, 15 to 20 years.

CULTIVATION.

The cultivation of the Agave Sisalana is very simple and inexpensive. The setting of the plants is almost identical with that of pineapple slips, the plants are placed in rows at stated distances apart, with occasional avenues left wide enough to drive through when gathering the leaves. During the first two years occasional weedings, once or twice a year, is all that is necessary. The plants are then

large enough to shade the ground and no further cultivation will be required.

It is the custom in Yucatan to set 1,200 to 1,400 plants to the acre, but this would be found altogether too great a number with the Florida variety of plant, which grow to a much larger size; 700 plants to the acre has been found the number, with this variety, in the Bahamas to insure best results and preclude the danger of the plants colliding and injuring each other with the sharp spines found in the end of the leaves.

YIELD.

The leaves of mature plants in Florida, when in a state of cultivation, will easily average five feet in length and two pounds in weight. The closest observations have shown that fifty leaves will unfold each year, and that number can be cut and relied upon as the annual crop. With 700 plants to the acre, this affords a yield of 35,000 leaves, or 70,000 pounds, per acre each year. Numerous experiments with Florida leaves, made with the recently invented and latest improved decorticators, has shown the yield of long fibre to average about 4 per cent. of the leaves, or 80 pounds to the 1,000 leaves. This would give a yield of 2,800 pounds of long dry fibre to the acre. It is claimed, however, that better results than the above are obtained, with freshly cut leaves. With the new fibre cleaners, the amount of waste or short fibre has been reduced to the minimum and amounts to a mere trifle, as compared with the old methods in vogue for cleaning leaf fibres.

PRICES AND IMPORTATIONS.

The annual circular issued by Wm. S. Daland, of New York, a statement of the dealings in hemps and jute, shows that on the first days of January from 1885 to 1895 inclusive, the price of Sisal Hemp to have averaged 6 cents per pound. The importations into the United States from Yucatan during 1894 amounted to 357,977 bales, or nearly 144,000,000 pounds. Notwithstanding the general depression that pervaded industries of all descriptions, this was a larger amount than ever imported in any previous year. The importations of Manila Hemp into the United States in 1894 amounted to 300,000 bales, or 120,000,000 pounds; this hemp usually sells for about two cents in advance of the Yucatan variety. It is everywhere admitted that the Florida variety of hemp is finer, stronger, more durable, of better strength and color, and in every respect superior to the Yucatan product, and manufacturers agree that in open market it

will undoubtedly bring at least two cents per pound more than Yucatan hemp, or at a price nearly equal with Manila.

COST OF PRODUCTION.

The cost of cultivation with the Agave Sisalana is inexpensive and amounts to but little or nothing after the plants are once established, as they will in a short time take care of themselves. The chief expense in producing the commercial article is in harvesting the leaves, extracting the fibre and placing it in the bale ready for market. A gentleman who has had many years of experience in the production of fibres, being thoroughly familiar with the industry as conducted in Yucatan, and having large interests in the Bahamas, and who is considered an authority on everything that pertains to the fibre industry, makes the following statement in regard to the cost of producing hemp: "This fact can be relied upon, with the improved decorticating machinery now available, the entire cost of gathering the leaves and preparing the fibre in the bale, will not cost to exceed one-fourth cent per pound, but of course will vary with facilities and location."

MACHINERY.

Several automatic leaf fibre cleaning machines have been invented during the past five years, and all have shown more or less merit. One patented in November, 1892, and manufactured by J. C. Todd, of 203 Broadway, New York, and Paterson, N. J., is meeting with great success and is considered as near perfection as it is possible to construct a machine of this nature. Mr. Todd's works are taxed to their utmost capacity the present year (1895) to supply the large demand for them in the Bahamas, where they are meeting with great favor. This machine is altogether automatic in its work and is capable of cleaning in the most perfect manner 50,000 to 60,000 leaves of the Agave Sisalana in a day of ten hours. The operation of the machine is as follows:

The operator seats himself before the table and lays the leaves on the feeding chains. Care is taken to lay the thick ends of the leaves to the right side, with more than half the length of the leaf hanging down. The chains then carry the leaves to the holding belts, by which they are presented to the first scraping wheel. The leaves having been cleaned for the greater part of their length by the first wheel, a device placed between the two scraping wheels transfers the clean portion of the fibre to the second holding belt, and the remainder is cleaned by the second wheel. There is no un-

cleaned or partially cleaned portions left in the middle of the leaf, as in the case with some other machines. The fibre is delivered from the machine straight and disentangled, cleaned from the pulp of the leaves in the most thorough manner with a minimum amount of waste, yielding an average of about 4 7-8 per cent. of clean dry fibre. The shipping weight of the machine is about 6½ tons and 12 to 15 horse power is required to operate it.

The following letter from Sir Ambrose Shea, Governor of the Bahamas, and originator of the hemp industry in that Colony, will show the esteem in which the Todd decorticator is held, and that the question of efficient machinery may well be considered settled:

Government House, Bahamas.
June 11th, 1894.

MR. FINIGAN:

Dear Sir—I have great pleasure in stating that my very careful examination of the scutching machine of J. C. Todd, now in successful operation at the plantation of Mr. Menendez, satisfies me that it efficiently meets all the requirements of our fibre industry. Its movements are easy and very effective, and it turns out the fibre in fine condition with the minimum amount of waste. After our repeated failures to obtain the machine we required, it is most satisfactory to me to know that we now have one that from its undoubted excellence must come into universal use in this Colony.

Yours very truly,

A. SHEA.

INVESTIGATIONS BY THE DEPARTMENT OF AGRICULTURE.

The late Hon. J. H. Rusk, while Secretary of Agriculture, was deeply interested in the promotion of the cultivation of the Agave Sisalana and other leaf fibre plants in Florida, and through his instrumentality Mr. Chas. Richards Dodge, special agent in charge of Fibre Investigations in the Department, was enable to spend portions of two winters in Florida, conducting a series of exhaustive investigations and experiments with the various leaf fibre plants found growing in the State. The results of these investigations are embodied in two reports by Mr. Dodge and published by the Department of Agriculture and known as Fibre Investigations, Reports Numbers 3 and 5. The fibre industry may, however, be conducted in Florida at the present time under far more favorable auspices than when these reports were published, for the reason that the question of cheap decortication is now settled.

In the report of the Secretary of Agriculture for 1892, the last issued by Rusk, appears the following in regard to the fibre investigations conducted by the Department:

"Early in the year the special agent in charge of the work spent some time in Florida, where an experimental cleaning factory was temporarily established and was successful in obtaining sufficient quantities of Sisal Hemp, the fibre of the False Sisal, Bowstring Hemp, Pineapple Fibre, etc., for manufacture and test to show their commercial value. The plantations of Sisal Hemp from plants furnished by the Department are growing finely and there is considerable interest in the culture. This is a product largely raised in, and exported from Yucatan. It is one supply, in large degree, of material for cordage and binding twine. It was supposed that it could not be raised in this country, but it is fast becoming demonstrated that it can be successfully produced in South Florida. The southern half of this State has wonderful possibilities in store for it, not only relating to fibres, but to sugar cane and semi-tropical fruits. The production of fibres is not the least of its possibilities. Even if the fibre inquiry should proceed no further, sufficient data have been collected to warrant us in the belief that experience and appropriate legislation will save to the country many millions of dollars now expended in the purchase of commodities abroad which might be produced at home."

In Fibre Investigations, Report No. 3, published by the Department of Agriculture in 1891, Mr. Dodge has the following regarding Sisal Hemp in Florida:

"The plant producing this fibre which for so many years has been a source of wealth to Yucatan, and is fast becoming of commercial importance to the Bahamas, grows in many portions of Florida, where its cultivation long ago passed the experimental stage. The literature of the subject as it relates to the culture of the plant in our own country is quite extensive, enough having been published, even as far back as the fifties, to prove the adaptability of both soil and climate of Florida to its successful cultivation."

The foregoing, from such eminent and impartial authorities, should be received with much credence, and it makes still more conclusive the evidence that the conditions existing in Florida, are everything that could be desired for the successful cultivation of the Agave Sisalana.

NO ENEMIES.

This is a plant that has no destructive enemies, there is no animal or insect parasite that preys upon it. It is un-

affected by droughts and inundations and a constant crop is assured under all conditions of weather, and the income may be as regular as the production. The yielding life of the plant covers a long term of years without any replanting. It requires no fertilization, and, as has been shown, little or no cost for cultivation after once well established.

THE PRODUCT NOT PERISHABLE.

Hemp from this plant is a product that does not deteriorate by age, as is the case with nearly all other cultivated crops, as cereals, fruits, vegetables, etc., that must be marketed at stated seasons to escape loss from decay and climatic changes; but it may be holden for improved markets for any duration of time, if properly housed, without any depreciation in value.

INEXPENSIVELY PRODUCED.

In producing this hemp no large and expensive plants of machinery, to depreciate by wear, are necessary; one decorticator is capable of performing the work for a large plantation, and properly cared for, with occasional replacing of the parts most subjected to wear, will last for a long term of years.

The following assertion has been made by a most qualified authority, Mr. T. Alber Smith, of Baltimore, that: "Yucatan has to-day, got the most profitable, the safest, and easiest managed industry in America." With all the data and facts relating to the industry obtainable, it would appear that the foregoing statement need not be looked upon as an exaggeration or overdrawn.

ADVANTAGES FOUND IN FLORIDA OVER YUCATAN AND OTHER FIBRE-PRODUCING COUNTRIES.

The advantages Floridas has over Yucatan, the Bahamas, or any other fibre-producing country, are as follows: Better and cheaper lands; larger and better plants, producing a superior quality of hemp; better and cheaper transportation facilities; close proximity to the largest seat of consumption; a salubrious and healthful climate, which renders possible the employment of better and more intelligent labor.

FLORIDA MAY SPIN ITS OWN FIBRE.

For practical reasons, neither Yucatan, the Phillipine Islands, India, or the Bahamas, can spin their own fibres, chiefest among these is, the unhealthfulness of those countries will not permit of skilled labor abiding in them. It

has been demonstrated that it pays best to spin cotton in the South near to the cotton fields; the same rule is equally applicable to leaf fibres, and there is no reason why, when Florida is able to produce hemp in sufficient quantities, that it should not be manufactured where produced.

INCREASE OF CONSUMPTION.

The consumption of Sisal Hemp in the United States has steadily increased and grown greater each year during the past fifteen years; statistics show that in 1880 the importations were 80,254 bales, while in 1894 they amounted to 357,977 bales. The annual consumption of Manilla Hemp has increased in an almost like proportion; in 1880 the importations were 159,594 bales, while in 1893 they amounted to 422,956 bales.

FLORIDA HEMP CAN TAKE THE PLACE OF SISAL AND MANILA.

Florida hemp will supply the place of both Sisal and Manila hemps in all the manufactures they enter into; the enormous quantities imported each year can easily be produced in Florida, and the nearly $20,000,000 that annually goes abroad to pay for these two foreign grown hemps may be saved to our own country.

THE HEMP INDUSTRY AS CONDUCTED IN YUCATAN.

The hemp industry in Yucatan is conducted on 200 estates, varying from 500 to 28,000 acres in extent. The size of the cultivation on the estates range from 250 to 3,500 acres. Twelve thousand Maya Indian laborers are employed on these estates. The largest of them employ locomotives in hauling the crop from the fields, others using tramway trucks or carts drawn by mules and oxen. The industry is conducted on similar lines in the Bahamas and large plantations is the rule, although many small farmers living in the neighborhood of the plantations are engaged in the cultivation, selling their leaves to the large growers.

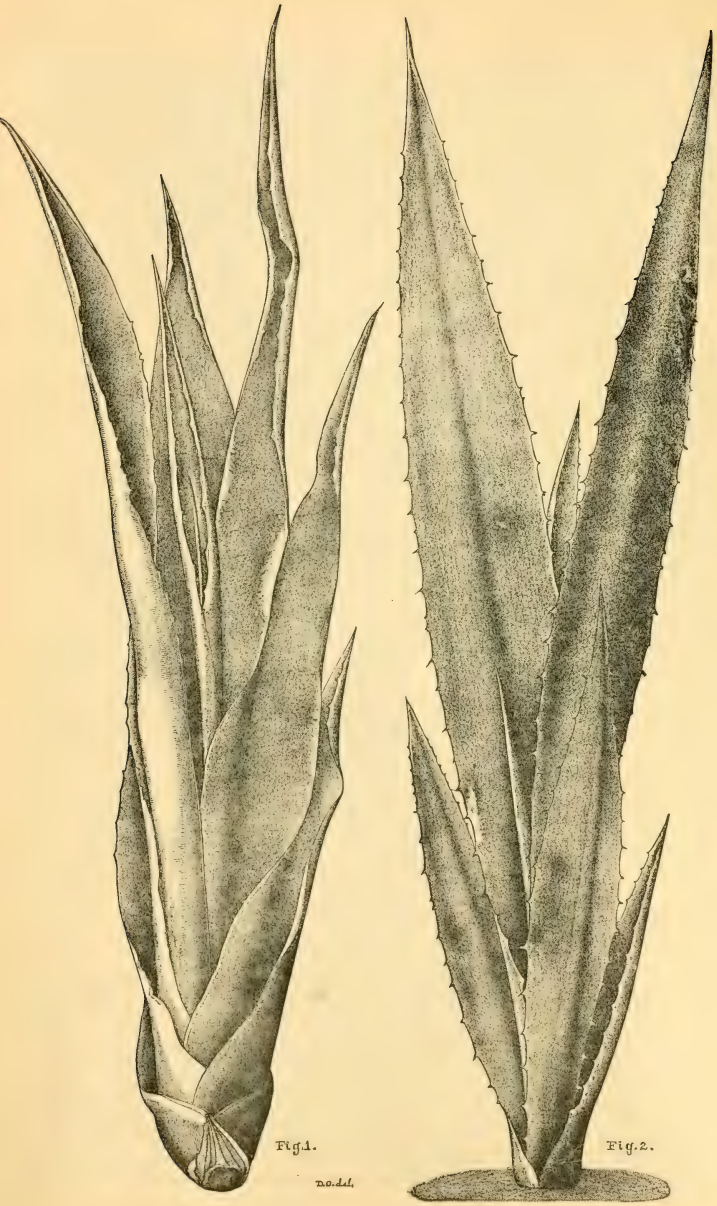
LARGE PLANTATIONS WIN BEST RESULTS.

For large investments probably no industry on the globe offers so many or better inducements for the profitable placing of capital as the production of hemp in Florida, certainly no other cultivated crop can show such a certain and constant source of income. Undoubtedly the best results would be obtained with large plantations, operated by companies and individuals having large capital, as conducted in Yucatan and the Bahamas.

SMALL FARMERS MAY TAKE UP THE CULTIVATION BY CO-OPERATION.

Small farmers living in the same neighborhood and not too remote from each other, by co-operation and an acreage sufficient to warrant the establishment of a decorticating plant to be located at some central point, may take up the cultivation with equally good results.

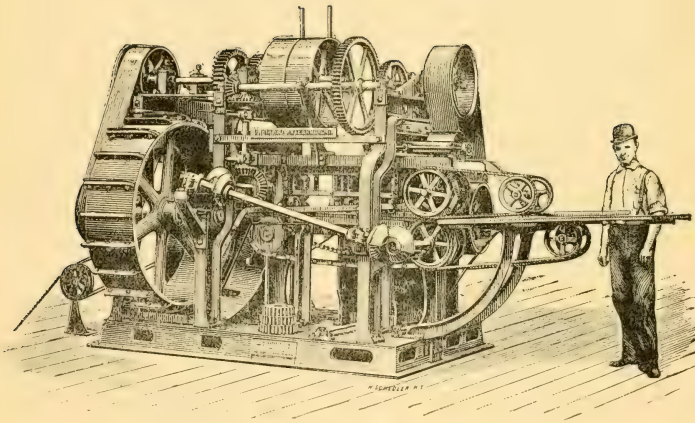
The average size of farms in the Northwest is 160 acres; it is a rare occurrence that a farmer is found with less than 100 acres of grain, wheat or corn, in cultivation. One hundred acres of Agave Sisalana may be attended to with far less expense for cultivation and preparation of the commercial article for market than 100 acres of wheat or corn, while the profits would be many times greater. One decorticator will perform the work of extracting the fibre for 400 acres, this would keep it employed every day in the year. A combination of four or eight farmers with 100 or 50 acres respectively, could, by co-operation, have an industry that would be found agreeable as well as profitable.



Pig. 1. Pole Plant from Florida. Fig. 2. Pole Plant from the Bahamas.

Appearance of Yucatan Sisal Plant, 15 years old.

Plant of Agave Sisalana in Pole or Flower.



The J. C. Todd Fibre Cleaner.

SANSEVIERIA

OR BOWSTRING HEMP.

This plant is found growing in many parts of Florida, in gardens as an ornamental plant principally, and its value as a fibre-producing plant is not generally understood. It has a varigated or spotted leaf and is commonly known as Rattlesnake Lily, or Spotted Lily. It makes a rapid growth in soils suited to its culture, the requirements being a rich moist soil. The plant is easily propagated and spreads rapidly, soon getting entire possession of the soil and completely eradicating all other vegetation. Once established in the soil, it will undoubtedly last for all time, and never require any replanting.

DESCRIPTION OF THE PLANT.

The following description of Sansevieria appears in United States Department of Agriculture, Fibre Report No. 5.

"There are three species of Sansevieria to which the name Bowstring Hemp is usually given, though there are a dozen species in the genus. The three species are S. guineesis, S. zeylanica and S. latifolia, the first named being known as African Bowstring Hemp. S. zeylanica is the best known, however, and is common on the Ceylon Coast, from which it takes its name. The plant has been known and prized in India from remote antiquity under the name of Murva. The genus Sansevieria abounds on the Coast of Guinea, around Ceylon and along the Bay of Bengal, extending to Java and the Coasts of China. They are stemless, perennial plants, throwing out runners, and having only root leaves which are thick and fleshy and usually sword or lace-shaped, with sheathing bases. They flower from January to May, and the plants grow wild in the jungles. They are easily propagated on most every soil from the slips which issue in great abundance from the roots, requiring little or no care and not requiring to be renewed often, if at all."

Sansevieria guineensis and Sansevieria zeylanica are the varieties met with in Florida, the former is the most valuable to cultivate for fibre, the growth being much more rapid and the leaves attain a greater length and weight, fully matured leaves measuring seven feet in length.

The fibre from this plant is very even, fine and hair-like, perfectly white and possessing great strength, the leaves are readily cleaned by the new automatic machines for decorticating leaf fibres. The fibre will no doubt be found a good spinning fibre and valuable for some forms of textiles, and in some instances a substitute for flax. The plant will stand a number of degrees of cold, and during the severe Winter of 1894-'95, when the coldest weather for sixty years was experienced in Florida, plants were found uninjured in partially protected situations, as the south sides of buildings and fences, as far north as Sanford. In a cultivated state, the plants grow so thickly that they protect themselves, and probably no damaging cold would ever penetrate the plants to do injury south of the 28th degree of latitude.

FLORIDA SOIL WELL SUITED TO SANSEVIERIA.

There are many thousand acres of land in South Florida that are suited to the cultivation of Sansevieria, sawgrass, muck and low flat woods lands being best suited to its growth. The plant requires no cultivation after once established, as it soon covers the whole ground, crowding out all weeds and grasses and making cultivation impossible and unnecessary.

EXPERIMENTS ALREADY MADE IN FLORIDA.

Sansevieria has been cultivated to some extent in South Florida. Mr. Geo. H. Bier, of Key West, has many acres in successful cultivation on Boca Chica Key. Dr. J. V. Harris, of Key West, has had much experience with Sansevieria and has a number of acres of fine plants growing in Lee County, near Fort Myers. Dr. L. D. Washburn, Director of the Experiment Station at Fort Myers, has experimented with it to quite an extent, and in a variety of soils. These gentlemen are very enthusiastic over the possibilities of Sansevieria in South Florida, as subsequent statements from them will affirm.

Mr. Charles Richards Dodge, while conducting his investigations with leaf fibre plants in Florida during the Winter of 1892, made exhaustive experiments with Sansevieria, the report of which forms a very interesting chapter in United States Department of Agriculture Fibre Report No. 5. He was enabled to secure a ton of leaves from Mr. George H. Bier's plantation on Boca Chica Key, many of them seven feet in length, from which he obtained a quantity of superb fibre, averaging over six feet in length.

USES OF THE FIBRE IN MANUFACTURE.

Mr. Dodge, in speaking of the value and uses of this fibe, says: "The material is too good for cordage, in the usual acceptance of the term. It is so much finer and better than the cordage fibres, so called, that it would doubtless find a use in the manufacture of fine twines, and I think, with proper preparation, could be made into a fair spinning fibre, and possibly be employed on some new form of manufacture. The fibre is fine, white and lustrous, the leaves yielding readily to treatment in the machine in the fresh state."

Mr. George H. Bier, in a letter to the Department of Agriculture, under date of May 12th, 1890, speaks of Sansevieria as follows:

"This plant was imported into England from New Zealand in 1735. It was then sent to the British West India Islands for propagation. It found its way to Cuba as an ornamental plant and in 1866 was brought as an ornamental plant from Cuba to Key West. The people, though ignorant of its value as a fibre plant, becoming alarmed at its fruitfulness, endeavored to eradicate it. It is superior in many respects to the Sisal plant. Its fibre is as strong and much finer. Its yield of fibre is greater, although it does not produce as many leaves to the plant, for it grows closer and can be regularly cut every year, each succeeding year producing a larger crop from the same roots. It will produce twice the amount of fibre in the same space of ground as the Sisal will do, and where the Sisal takes three years to mature or attain its greatest growth, this plant will produce in eighteen months a leaf nearly five feet in length."

At the request of Mr. Dodge, Dr. J. V. Harris, who has experimented with Sansevieria for a long term of years, prepared some interesting statements relative to his experience with the plant, and which were published in the United States Department of Agriculture Fibre Report No. 5. These statements give the experience of a practical man as to the propagation and cultivation of Sanseveria, also other interesting facts relating to the plant and its fibre, and they are herewith reproduced:

THE FLORIDA SANSEVIERIA.

This plant, which is commonly known as Bowstring Hemp, is a native of Tropical Africa and the East Indies.

The Sansevieria has long been known as an ornamental plant, but, although one of the most valuable fibre-producing plants in existence, it has never, so far as I am aware, been utilized for commercial purposes. My attention was

attracted to it about twenty years ago. Whilst examining it as an ornamental plant, I discovered that it afforded a large amount of fine, strong fibre. I immediately began making experiments with its culture, and was only prevented from going into the cultivation of it for the purpose of introducing it by the want of the proper machinery for cleaning it. Since that time, however, machines have been placed upon the market for cleaning Sisal Hemp, which clean the Sansevieria in a very perfect manner. I am convinced that the time has arrived to call attention to the valuable properties possessed by this hitherto commonplace plant.

In propagating the plant, for convenience, the leaves are cut into sections about four inches long, and inserted into boxes of earth to the depth of about two inches; the soil must be moderately dry, as too much moisture will cause the leaves to rot; the boxes must be placed in a moderately shady place, and in a few weeks' time will put out numerous fibrous roots, which will soon be followed by suckers. The plant can also readily be propagated by sections of its rhizomes, or roots, which grow without any difficulty. (See Plates VIII and IX.)

Sansevieria requires good rich soil to succeed well, and will, under favorable circumstances, acquire its full growth in about twelve months' time; ordinarily, however, it will not acquire its full growth until some time in the second year.

When once the land is stocked with its growth, it will always, when cut, give a full growth from the roots inside of twelve months, so that it is perfectly safe after the second year to count on a full crop every year, the growth each year becoming denser, and in a few years becoming so thick that it would appear to be impossible to cultivate it, which, however, appears to be needless, as when once fully established it takes entire possession of the soil, entirely eradicating everything else; it does not appear to materially exhaust the soil, as it will grow for a number of years in the same place, and continue to make vigorous growth.

Sansevieria is essentially a tropical plant, but will stand a slight frost. It will grow luxuriantly upon the rich lands south of the latitude of the Caloosahatchee River upon the West Coast, and of Lake Worth upon the East Coast. It will, after reaching maturity, if not cut, stand without injury for a number of years, the plant at the end of that time affording just as good fibre as in the first or second year of its growth. I am satisfied that a plantation would last over ten years without any necessity for renewing it or for interfering with it in any manner. Sansevieria will, after it is well

established, afford a crop of five tons of clean fibre per acre, worth, upon estimate, about $100 per ton. I selected a few square feet, where the growth was thickest, as an experiment, to show how much a crop was capable of producing, cut and cleaned the leaves, and found that it gave at the rate of 13½ tons of clean fibre per acre. I do not, however, believe that the average crop will go over five tons per acre, which I consider a fair estimate.

The fibre of the Sansevieria is capable of being manufactured into anything from the heaviest cordage to the finest fabric for ladies' dress goods. I conversed with an English gentleman, who told me that he had seen a few yards of cloth manufactured from the fibre, as an experiment, in England, and that it rivaled the famous pineapple silk in beauty and fineness of texture. When we consider the great ease with which the plant is propagated, the rapidity of its growth, and its enormous yield of fibre, together with the various uses to which it may be applied, we cannot fail to be impressed with its importance. Flax manufacturers are reported as saying that if they can get the fibre at $100 per ton they can run flax out of the markets of the world. Another great recommendation of the plant is, that it has absolutely no enemies among the insect tribe, and is not injured by rains or storms, nor by drought; when once fully established, a calculation can be safely made upon an average crop. The expense of cultivating the crop when established will, after the second year, be almost nothing, as the crop will take care of itself. About the greatest expense will be the cutting and hauling the crop to the machine for cleaning it.

I have been experimenting with the various fibre plants suitable to the climate of South Florida for more than twenty years, and know of no other fibre plant which I can conscientiously recommend for cultivation, with the view of making money. I do believe, however, that any person with any knowledge of farming, who has the necessary capital to back him, has a perfectly safe investment—certainly much safer than most investments made every day by the business world and considered as perfectly fair risks.

J. V. HARRIS, M. D.

The estimated yield of fibre, as given by Dr. Harris, seems unreasonably large, but when it is considered that the leaves of mature plants are from six to seven feet in length and that they grow as thickly as they can possibly stand, the yield of fibre cannot be otherwise than enormous. Even if the product of one acre should be only one ton of fibre, what other cultivated crop could show such returns for so small an outlay? The estimated worth placed upon

the fibre by Dr. Harris, $100 per ton, is altogether too low for so valuable a fibre. It is doubtful if the market price of Sansevieria fibre would ever be less than $150 per ton, which is about the average price of Manila Hemp. It would not require a connoisseur in fibres to detect the superiority of Sansevieria over Manila.

In the report of the Department of Agriculture for 1892, Secretary Rusk speaks as follows regarding Sansevieria:

"Large plantings of Sansevieria, or Bowstring Hemp, have been made in Florida during the year, and those interested in this new industry are sanguine of success. The plants grow readily, spreading rapidly, and can be cheaply harvested and cleaned, while the fibre, by its superiority, can be used in the higher grades of manufacture."

The statements of these prominent and well-known authorities all go to establish and demonstrate beyond a doubt the great value of Sansevieria as a fibre-producing plant. The ease with which the plant can be propagated and grown, the brief period to wait for it to become profitable, the enormous yield and value of the product, should make the cultivation of Sansevieria in South Florida highly remunerative.

Sansevieria Guineensis.

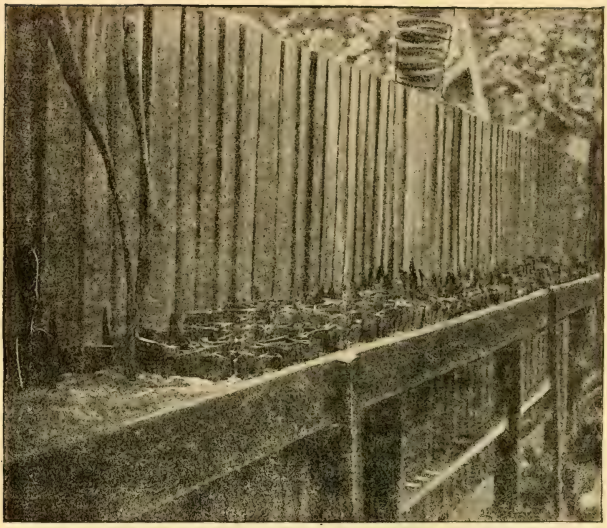


Fig. 1. Sansevieria Cuttings in Propagating Bed.

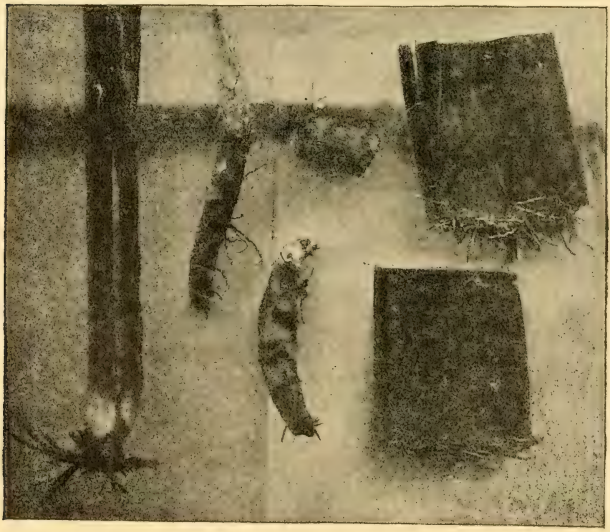


Fig. 2. Group of Partially Grown Plants.

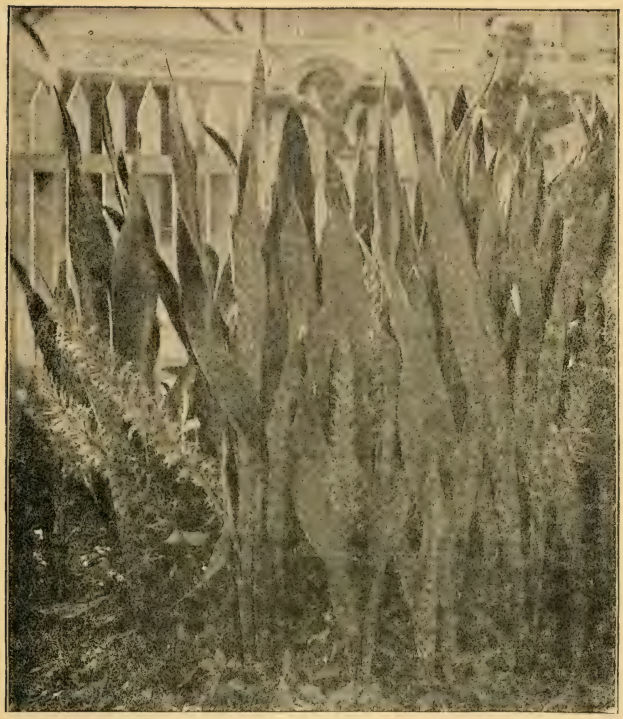


Fig. 1. Sansevieria Plants in Blossom.

Fig. 2. Advanced Plants in Propagating Bed.

BROMELIA SYLVESTRIS

OR WILD PINEAPPLE

This is a plant found growing abundantly, usually in a wild state, in Mexico, Central and South America and also to some extent in the West Indies. Bromelia Sylvestris will make a luxuriant growth in sterile, rocky barrens, where no other vegetation can maintain an existence. It also thrives and makes an enormous and rapid growth in rich, moist soils, the leaves reaching 12 feet in length. So the question of soils in cultivating the Bromelia Sylvestris would be a secondary consideration, as it will, without doubt, make a good growth in any variety of soils, in a tropical or semi-tropical climate.

The leaves of this plant are identical in shape with the pineapple leaf, and the plant is commonly termed wild pine-apple. The leaves of mature plants are from six to twelve feet in length and four inches in width at the widest part and are armed with ugly hooked spines or thorns.

The plant is propagated same as the pineapple, by suckers and slips. It has been cultivated to some extent in Mexico, but has never been brought into a state of cultivation like the Sisal plant, owing to the difficulties of adaptation of machinery for extracting the fibre.

VALUE OF THE COMMERCIAL ARTICLE.

The commercial article is known as pita, and is a fine and exceedingly strong fibre. The product is mostly manufactured in Mexico, into hammocks, nets, cordage, carpets, and articles of common use to which it is adapted. Only a limited amount of the manufactured fibre has been exported, but enough of this has been done to show the outside world the great value of the fibre, and there can be no doubt that when this fibre is produced in large quantities there will be a great demand for it, and at satisfactory prices.

The following extracts from eminent authorities on fibres will show the great value of pita and the esteem in which the fibre is held.

Mr. P.L. Simonds, an English authority on British industries, says:

"Ropes and cordage made of it are much stronger and more durable than those made from hemp; they are also

lighter and more pliable; do not require tarring, by which hempen ropes lose much of their strength, and bear the alterations of dryness and moisture with little injury, while the difference in hygrometric action is considerable.

"Cables made of this material are acknowledged by the Admiralty Board to be much superior to those made from hemp.

"The weight of pita is one-sixth less than hemp, thirty feet of one-inch rope made of the best hemp from the Royal Dock Yards weighing twelve ounces, while the same made of pita only ten ounces.

"The superiority of the pita over hempen ropes is undoubted, and I annex an extract from a report by a Belgian engineer who had closely studied the question: "Ropes made from the pita," says Mons. Chevremont, "possesses a greater average strength by four times than those made from hemp of the same diameter and manufactured by the same process."

"By the operation of tarring, ropes of hemp lose nearly a quarter of their strength, while ropes made from the pita, from their nature, are exempt from this operation, their natural gum acting in lieu of tar, and their smooth surface protects them from wear by friction.

"The specific gravity of ropes of pita, compared with ropes of hemp, is as nine to fifteen; it is, therefore, clear that a rope of the vegetable silk weighs six-fifteenths lighter than a rope of hemp of the same diameter and length.

Squier, in his "Tropical Fibres," states, that the fibre of this plant is probably more valuable in every sense than those of any other tropical plant, and would seem to be produced more readily than any other.

Dr. D. Morris, Assistant Director of the Royal Kew Gardens, England, publishes the following on the fibre of the Bromelia Sylvestris:

"There are several samples of fibre of wild pineapple, Bromelia Sylvestris, from the West Indies and Central America at Kew, but there is no record of their commercial value. A sample, supposed to be from this plant, was lately sent from Trinidad, upon which the brokers reported as follows: "Not yet in commercial use, but destined, we think, to a successful future; fine, soft, supple fibre, strong, and good color, ample length; say £30 per ton and upwards."

In United States Department of Agriculture, Fibre Report No. 5, Mr. Charles Richards Dodge, has the following interesting notes regarding this plant:

"This specie is found abundantly throughout the tropics, and there are no collections that do not contain superb

samples of its fibre. Specimens brought by me from Paris, presented by the Mexican Commissioner General, are among the finest I have seen, averaging four feet in length, the fibre being soft, white and brilliant.

"The wild pineapple abounds on the rocky hills of the West Indies, particularly Jamaica, where the plants are used as hedges and fences. Its leaves are steeped in water by the natives, and, after beating with a wooden mallet, yield a strong fibre. It is in common use on the island of San Domingo, and is favorably mentioned by Dr. Parry in his report.

"The leaves from which the fibre is obtained are from 1½ to 3 inches in width and 5 to 8 feet long. They are quite thin and are lined with a fine, tough fibre, which some authorities consider a superior substitute for flax. In portions of Mexico the Bromelia is cultivated for its fibre, which is described as very fine, from 6 to 8 feet in length, and from its fineness and toughness commonly used in belt making works. It also finds application in the manufacture of a great variety of articles. In Mexico the leaves were formerly subjected to the slow and laborious process of hand scraping, but, I am now informed, are cleaned by machinery, as there is a considerable demand for the product.

"Specimens of Bromelia fibre from British Honduras was brought to the notice of the Royal Society of Arts in 1857, and from examinations then made it was ascertained that each fibre contained from five to twelve or more filaments, held together by gummy matter capable of being dissolved by proper processes. Specimens had been passed over the comb or hackle of a flax mill, and had been pronounced by the most experienced flax spinners of England to be greatly superior to Russian flax, and approaching the best description of Belgian in capability of application to the finest textile frabrics.

"It is said that the more mature the plant the coarser and longer the fibre, so with this knowledge it is an easy matter to select just the quality of fibre desired. The plants are armed with spines or thorns—used by the natives for needles and pins—though these disappear in cultivation."

IMPORTANCE OF ITS INTRODUCTION INTO FLORIDA

While the Bromelia Sylvestris is not found growing in Florida, the plant having never been introduced into the State, there can be no doubt but that it will grow in this State with as equal luxuriance as in Mexico, the West Indies, or any other tropical or semi-tropical country, and the matter of introduction should receive no further delay.

As before mentioned, the only obstacle that has been in the way to prevent this plant being extensively cultivated has been the want of machinery that would effectually clean the leaves and produce fibre at a low cost. This has been overcome, as experiments made with the recently improved fibre cleaners, has demonstrated that they will clean the leaves of the Bromelia Sylvestris with as equal efficiency as those of the Agave Sisalana.

Florida has now the opportunity of utilizing another valuable fibre plant, the cultivation of which promises to be attended with great success and profit.

PINEAPPLE FIBRE.

The cultivation of the Pineapple was commenced in Florida about the year 1860, on one of the Florida Keys, since which time it has gradually increased and grown greater, and has now become an important Florida industry. The principal Pineapple growing districts of Florida at the present time are the keys, the East Coast from Biscayn Bay to as far north as Melbourn, on Indian River; Lee, DeSoto and Manatee Counties, the lake region of Polk County and the vicinity of Orlando in Orange County. Pineapples are cultivated to a more or less extent in many other parts of South Florida. The industry has proved to be a very profitable one, and is now receiving much attention and the acreage is being constantly increased.

It is generally understood that the leaves of the Pineapple plant contains a fine and valuable fibre, that is capable of being used in the manufacture of valuable and delicate fabrics. Only a limited amount of Pineapple fibre is produced, and that in countries where labor is plentiful and cheap, and the work of extracting the fibre is performed by hand.

There are thousands of tons of Pineapple leaves that go to waste each year in Florida, that with machinery to extract the fibre therefrom, could be utilized to a valuable purpose and add materially to the income now derived from the Pineapple industry.

MACHINERY.

Machines are now constructed specially for cleaning the leaves of the Pineapple plant in large quantities, and the fibre may be produced at a minimum cost. These decorticators are built on the same principle of the automatic machines for cleaning the leaves of the Agave Sisalana and Sansevieria plants, the cleaning parts being made smaller and finer adjusted, to act on the much smaller Pineapple leaves. It is claimed for this decorticator that it will clean 200,000 Pineapple leaves in a day, which would amount to about ten tons of leaves, with a yield of about 600 pounds of fibre.

The following notes regarding Pineapple fibre, appear in United States Department of Agriculture Fibre Report No. 5:

"In the Rungpore district of India, the fibre is much used by the local shoemakers for thread, though the plant is cultivated principally for its fruit bearing qualities, the fibre being little appreciated. In the Phillipine Islands it grows in great abundance and is valued on account of the fineness of the fibre, from which is woven the celebrated Pineapple cloth of the Phillipines.

"The fibre of the Pineapple leaf is very soft and fine, the filaments being quite flexible and resistant. They yield readily to treatment in the alkaline bath and are easily subdivided especially when subjected to trituration.

"In the East Indies, where the Pineapple was introduced as early as 1600, the fibre is extensively used in the manufacture of the delicate fabric called pina, as well as for cordage. Pina is considered to be more delicate in texture than any other known to the vegetable kingdom.

"When the plant is grown for fibre, as in the Phillipine Islands, it is customary to take off the fruit before maturity, that the leaves may be more fully developed.

Mr. Charles Richards Dodge, while conducting his investigations with leaf fibres in Florida, made complete experiments with Pineapple fibre, and has the following to say regarding it:

"The fibre was extracted with the Van Buren machine, which, while it turned out a superb product, would be wholly inadequate for the work from a commercial standpoint, as only two or three leaves could be fed at a time. The Florida fibre, when simply plunged into cold water for a few minutes after coming from the machine and then dried in the sun, came out almost white, with a fineness and softness unequaled by any other leaf fibre that I have extracted."

Mr. D. Morris, Assistant Director of the Royal Kew Gardens, England, makes the following statements regarding Pineapple fibre:

"Although not at present in commercial use, this fibre has a future of considerable importance before it. It is finer and stronger than that yielded by any other plant, and in the Phillipine Islands, where the West India Pineapple has become thoroughly naturalized, a beautiful fabric, known as pina cloth, is made from it. A rope of Pineapple fibre 3¼ inches in circumference bore a strain at Calcutta of 57 cwt."

The leaves of the Pineapple are of no value to the plant after the fruit has been removed, and using them for fibre would simply be utilizing a waste product to a valuable purpose. While the production of fibre from the leaves of the Pineapple plant would be nothing like in extent that from

other plants, which would be cultivated especially for fibres, a large amount of another valuable Florida fibre could be placed upon the market, and the income now derived from the cultivation of the pineapple be largely increased.

Fig 1. Pineapple Plant, with Fruit.

Fig, 2. Pineapple Field in Florida.

FLORIDA JUTE,

OR URENA LOBATA.

This plant is indigenous to Florida soil and climate, and is found growing in a wild, uncultivated condition in nearly every part of the State. It is commonly known as "Cæsar Weed," and termed by some as "French Cockle Burr."

This plant produces an excellent fibre, which is found in the bark of the plant, and belongs to that class known as bast fibres, as Jute, Ramie, etc. The fibre is long, fine, soft, nearly white, and has a silk-like lustre, and in the opinion of competent authorities, will make an excellent substitute for flax.

The following in regard to Urena Lobata appears in a work entitled "The Uncultivated Bast Fibres of the United States," by Mr. Charles Richards Dodge, and known as United States Department of Agriculture Fibre Report No. 5:

Another malvaceous plant which grows wild all over India, and which is common in Florida, is Urena Lobata. It also abounds in South America, its Brazilian name being Guaxima, or Uaixyma,* while it is known in Venezuela as Cadillo. Its Indian name is Bun-ochra, the natives of India considering its fibre useful for manufacture into sacking and twine. It is called a "tolerable substitute for hemp."

Dr. Ernst, Director of the National Museum, Caracas, Venezuela, describes the fibre as very fine, white in color, and a meter in length. It is very strong, and takes dyes readily.

Fibre of Urena Lobata was received from Brazil (exhibition, 1876), where it is extracted readily and makes very strong cordage. "It takes color well, and the dyes are lasting." In the East Indies it has been used for the manufacture of paper. Spon states that slips of sized paper weighing 39 grains made from this fibre sustained 75 pounds against Bank of England note pulp 47 pounds. Urena Sinuata is another Indian species.

I have found Urena Lobata growing in many portions of Florida, both on the east and west coasts, though I have never seen its slender stalks over 3 feet in height. It was several times pointed out to me as "Ramie," by people who had never seen the true Ramie growing. Recently the plant has been sent to the Department from several localities in Florida, with inquiries as to its value commercially. A common name which attaches to the plant in Florida is "Cæsar Weed."

This plant, in common with many other Florida weeds, grows up in the early spring and summer months, and dies down in the late autumn. As Mr. Dodge was conducting his experiments in Florida during the winter and early spring, the plant was not at its best when it came under his observation.

Mr. Ed. L. Owens, of Dade City, Fla., has experimented with the plant to quite an extent, and is very sanguine as to its great value as a fibre-producing plant. In writing of his experiments, Mr. Owens says:

"I have some plants in cultivation that grew from 8 to 10 feet high and from $1\frac{1}{2}$ to 2 inches in diameter, and the branches would reach out from 4 to 6 feet. The plant looks very much like the cotton plant, and branches out like the cotton plant, and when young could easily be taken for it. If planted in rows from 3 to 6 inches in the drill it will grow perfectly straight and branch out but little. After my plants matured I extracted the fibre from the bark, which was done by placing the stalks in water for eight or ten days, when the fibre could easily be removed with the hands. I know two to three cuttings can be made in a year, and when once planted and taken root the plant is there for all time."

The method used by Mr. Owens in extracting the fibre, is identical with that practiced by the natives of India in producing Jute. The recently invented Ramie decorticators work with as almost equal efficiency upon Jute stalks, as upon Ramie, and there can be but little doubt, with, possible slight modifications, that they would do equally as well with the stalks of the Urena Lobata. This may make possible the extensive cultivation of this plant in Florida. The experiments already begun should be continued, and the hitherto despised weed may become a source of great income to the State.

The Cæsar Weed (Urena Lobata).

RAMIE.

For the past twenty-five years the attention of the textile world has been largely directed toward Ramie, and at the present time it is exciting still greater interest than heretofore, by reason of the recently invented machinery and processes for decorticating and preparing the fibre in a finished condition for the manufacture. This interest is not confined to our own country, but is widespread and almost universal; England, France, Austria and Germany, where numerous factories have been established for Ramie manufacture, being particularly interested. It has not been possible, however, to take up the extensive manufacture of Ramie textiles, as only a limited supply of the raw material has been obtainable.

HISTORY OF RAMIE.

The literature that has been published regarding Ramie is quite extensive, and the history of the plant and fibre is generally well understood, but for the benefit of those whose knowledge of the plant may be only imperfect, the following brief description is given.

Ramie is known as China grass and Rhea, and belongs to the genus Urticaceae. It is not, however, a grass, but closely resembles the common nettle of Europe, and is frequently called the stingless nettle. The botanical name of the plant is Boehmeria Nivea.

For centuries Ramie has been cultivated in China, and four thousand years ago Egyptian ceremenis were made from Ramie fibre, which is proven by the fact that it is found among the wrappings of mummies. It has, also, long been cultivated in Japan, in Java, Bornea, Sumatra and in the East Indies, and during the present century has been introduced into other countries. Its introduction into the United States, according to United States Agricultural Reports, dates back to the year 1855.

Ramie, when fully grown, attains a hight of four to six feet, with a prolific yield of leaves, which are green above and a silvery white beneath, the fibre is found in the bark surrounding the stalk, which has a pithy centre. The plant grows rapidly and produces several crops a year without any replanting, the number depending upon the climate where cultivated.

SOIL AND CLIMATE.

Ramie requires a warm, humid climate, with as near immunity from frost as possible, so that a continuous growth may be maintained, to mature best and most profitable results. Rich and light sandy soil is best adapted to Ramie, and it flourishes on alluvial soils in which there is no large admixture of clay, to cause liability to bake and become hard.

In a recently published work, entitled "The Cultivation of Ramie in the United States," by Mr. Charles Richards Dodge, and known as United States Department of Agriculture Fibre Report No. 7, appears the following in regard to the questions of soil and climate:

"In general terms, it may be said that the Ramie plant requires a hot, moist climate, with no extremes of temperature, and a naturally rich, damp, but never a wet soil, the necessary moisture to be supplied by frequent rains or by irrigation; in other words, such a climate and soil that, when the growing season has commenced, the growth will be rapid and continuous. In the United States the best localities, so far as experiment has determined, are portions of Florida, Mississippi, Louisiana and Texas on the Gulf, and Central California on the Pacific Coast.

In the Gulf States, Ramie has been grown experimentally in a great variety of soils, from the light sandy uplands to the rich black lands of the Louisiana bottoms, though light, sandy, alluvial soils have always given the best results. In California, deep alluvial, sandy, or loamy, which, when well prepared, will hold their moisture through the growing season, or that can be irrigated, are most commonly selected. Any good soil that will produce other crops is recommended, particularly if well prepared, or that holds its moisture throughout the growing season, or which can be irrigated.

PROPAGATION.

Ramie can be propagated by four different methods, viz: by seed, by cuttings, by layering and by division of the roots. Growing from seed requires very careful attention, but is easily accomplished by planting in boxes or frames supplied with a proper degree of moisture and protected from severe winds, rains and hot sun. The plant beds can be protected by grass or any coarse cloth and in piney lands a cheap protection can be constructed with poles covered by pine straw. Watering the seed beds should be done by using a fine spray nozzle on a watering can, as the seeds are very small and care must be taken not to plant too thickly. A

good plan would be to mix the seed with ashes or some finely pulverized earth before sowing. It should be brushed in and slightly covered. The young plants are very delicate, and make slow growth until they have formed roots, after which they grow rapidly. When the plants are two or three inches high the sunlight may be gradually admitted to them. In five or six weeks they will be strong enough to transplant to the field under conditions similar to planting garden plants. If seeds are planted in the fall they should remain undisturbed until the next spring, by which time they will have formed roots and can be handled without care.

Cuttings from Ramie grow more readily than from almost any other plant. Early in the spring the stems should be cut into lengths from six to eight inches and placed in the ground obliquely, leaving but a small portion remaining exposed. This can be continued as long as the ground is quite moist before hot and dry weather sets in, after which they would require some watering and shading. The cuttings should be placed close together in rows to facilitate weeding. They will form roots in fifteen to twenty days and may be transplanted a few weeks later.

Layering the stems is another simple and easy method of propagation. An economical plan for getting a supply of roots is, to plant roots five or six feet apart in rows. Each root sends up several shoots, which, after they have attained a length of two or three feet, can be bent down in different directions into small trenches and covered with several inches of earth, leaving two or three inches of the top out of the ground. Roots will form along the entire length of the stalk and send up new shoots, which can in turn be layered.

Root division is the most reliable and convenient method for planting on a large scale. Roots that have been growing one season can be sub-divided into many parts and each part planted separately. They should be dug like sweet potatoes and cut in pieces from three to five inches long. The tap or water roots should be rejected, as they contain no eyes and will not grow.

Ramie roots can be made to multiply in great profusion; in the United States Agricultural Report of 1867, page 220, appears the following statement: "100 roots in nine months produced 40,000 plants." Any one who may obtain a small amount of seed or a few roots, can, by a careful observance of the foregoing rules for propagation, have in a brief period enough roots to plant a large acreage, and at the same time become familiar with all the essentials of cultivation.

PLANTING AND CULTIVATION.

The planting and cultivation of Ramie is simple, easy and inexpensive, as much so, in this respect, as any other

cultivated crop of the South. Mr. Henry Willet, of Louisiana, a gentleman who has given Ramie much attention, being one of the pioneers in the cultivation in the United States, and having an experience with the plant that dates back for more than a quarter of a century, has prepared an excellent paper on this subject, and it is herewith reproduced entire:

"Much has been said and written on Ramie, but I have yet to see the first effort showing what the preliminary steps are towards the cultivation of this plant. Consequently, I will endeavor to demonstrate as briefly as possible the course pursued by myself for years past.

To cultivate Ramie successfully, good soil susceptible of thorough drainage, must be selected. Ramie requires moist, not wet ground. Poor soil may be utilized by fertilizing. In preparing the soil, the ground should be well plowed during the fall and winter months, and allowed to lay exposed to the action of the weather. The deeper you plow the better.

When preparing the land for planting Ramie roots or cuttings, the soil should be thoroughly pulverized and laid off into ridges by throwing the furrows together so as to make ridges two feet wide. This will allow the plants to spread and cover the entire surface. The center of the ridges should be five feet apart. After drawing the ridges well up make their tops rather flat by giving them a light chopping with a hoe, making the earth line at the same time. When ready for planting place the roots about ten to twelve inches apart obliquely in the ridges with the tops of the roots about three inches under ground. This mode of planting requires 10,000 pieces of roots to the acre and insures a full crop the first year.

For the purpose of increasing the plantation, where roots are scarce, they can be planted four or six feet apart in the ridge rows, and each root will make several bulbs which, when well grown, can be cut off and planted; and when the stalks have grown to 2 or 3 feet high they can be turned down each way from the mother root and covered with earth, leaving the tops two or three inches out of the ground. After the eyes of the layered stalks have sprouted they can be cut from the mother root and left to grow.

Frequent cutting in a field planted in this manner will increase the stalks wonderfully fast. By this mode of planting a large number of acres may be covered with a limited amount of roots or cuttings. Ramie cuttings will propagate if planted immediately after cutting the same. Ramie seed will do well also if care is taken to provide hotbeds. Sow

seed in very finely pulverized and highly fertilized earth. When the seed has germinated to the height of from four to six inches transplant when the weather is favorable.

Whilst Ramie is growing, say from roots, cuttings or seeds, the grass and weeds should be kept down until it reaches a height of about eighteen inches, when the Ramie will take care of itself.

Ramie is a perennial plant, when once started, the soil and drainage kept in good condition, it will grow on regularly each succeeding year, and after the second year of its existence there is little or no trouble. I am satisfied that in order to receive satisfactory results Ramie should be allowed to grow as close as possible, the more stalks produced the more profitable the yield.

Three crops yearly are absolutely certain, and four are possible. I have no data as to the amount of tons that can be produced per cutting on an acre of ground, but heard it variously stated, say from five to eight. It depends much on the richness and cultivation of the soil.

I have planted Ramie for a number of years and during this time have devoted much time in experimenting with the view of ascertaining the best method of cultivating Ramie. I think the few suggestions made in the foregoing will carry any one through successfully, should they desire to embark in the cultivation of this beautiful fibrous plant. Its value has been established long ago, and I am satisfied that the time has arrived when the value of this plant will be made manifest to the planters of Louisiana.

New Orleans, La. HENRY WILLET."

HARVESTING.

Ramie may be harvested when the stalks turn from green to reddish brown near the base, and when the brown color extends upward about six inches from the roots the fibre is at its best, and the crop may be said to be ripe for harvest. Other indications of maturity are the sprouting of the buds at the base of the stalks, and the ease with which the leaves may be stripped by passing the hand down the stalks. When the plants arrive at these stages they should at once be cut, to give the next crop a chance to grow, as well as to secure the best quality of fibre. The crop may be cut with knives, grass hooks and scythes; it is also probable a reaper or mowing machine, of perhaps special design, may be used in cutting the stalks.

DECORTICATION.

Decortication, as applied to Ramie, means the separation of the woody portion of the stalks from the fibre. There are two processes, known as green and dry decortication,

for when the work is done by machinery the stalks must be green and fresh or thoroughly dried. In either case the wood is brittle and can be easily broken and detached in small sections from the ribbons.

In a few days after the stalks have been cut, the wood becomes tough and the gum, from loss of moisture, becomes like liquid glue, causing the outside covering to stick to the wood with such tenacity as to render separation by machinery impossible. When the stalks have become thoroughly dried the conditions change, the wood becomes brittle again and the gum, to a great extent, loses its adhesiveness, the stalks can then be decorticated as easily as in the green state. However, the drying of the stalks is attended with considerable labor and expense, and there is great liability of injury to the fibre from fermentation and mildew. In moist climates it has been found that the drying of Ramie stalks is difficult to acomplish, especially during rainy seasons and it is impossible to dry a large Ramie crop by artificial methods. Green decortication is, therefore, the most practical and inexpensive method of handling the Ramie crop, particularly in those countries whose climatic conditions will not admit of drying the stalks in the sun.

There are machines specially adapted to working Ramie green, and others for working it dry; while a few claim to work it either green or dry.

DEGUMMING.

The decorticated Ramie ribbons, before they are ready for manufacture, must undergo another process, that of degumming, as it is termed. Mr. Charles Richards Dodge, in his recent work on "The Cultivation of Ramie in the United States," and known as United States Department of Agriculture Fibre Report No. 7, has the following interesting and comprehensive statement regarding this matter:

"Before the Ramie fibre is hackled (combed), it must be subjected to a chemical operation analogous to retting, to which the French have given the name "degommage"—hence the English term "degumming." The gums holding together the filaments of flax are soluble in water and therefore the retting accomplishes the separation of these filaments without difficulty. The gums which hold together the structure of Ramie bast are not soluble in water, but require peculiar chemical treatment, which can be more economically applied to the extracted fibre than to the fibrous substance as it exists in its natural state in the stalk as harvested, and so the retting, or degumming, of Ramie is usually done by the spinner, who, knowing the use to which the prepared fibre will be applied, degums the raw product

to suit his own special needs. The farmer then has nothing to do with this operation, and need not interest himself in it further than to know if his product, when extracted and degummed, is fit for spinning, or up to a standard of quality that will insure profit from the culture; nor is this operation connected with the work of decortication.

"Through the researches of the late M. Fremy, member of the French Institute, it has been shown that the gums and cements holding together the filaments of Ramie are essentially composed of pectose, cutose and vasculose, while the fibre itself is composed of fibrous, cellulose and its derivatives. The theory of degumming, therefore, is to dissolve and wash out the gums without attacking the cellulose.

"In order to eliminate the vasculose and cutose, it is necessary to employ alkaline oleates or caustic alkalies employed under pressure, and even bisulphates and hydrochlorites. The gums being dissolved the epidermis is detached and can be mechanically separated from the layers of fibre by washing. The larger number of degumming processes in present use embody these general principles."

YIELD.

Various estimates have been placed upon the yield of Ramie per acre, this will depend largely upon the climate, cultivation and number of cuttings it is possible to make during the year. Mr. Charles Richards Dodge, in his recent report on Ramie, has the following on the question of yield and crops:

"Taking ten weeks as the average time required to mature the crop, three crops would require a growing season of thirty weeks. If the climatic conditions of the section where the crop is growing are such that the requisite degrees of heat and moisture can be kept up uniformly for a period of thirty weeks, then three crops can be readily grown. If, on the other hand, the first and third crops are of slow growth, while the second crop, which has been produced in midsummer, is of rapid growth, a uniform grade of fibre in the three crops can not be produced, and two sure crops will therefore be better than one sure and two uncertain crops."

Professor Hilgard makes the following statement regarding the rate of growth in California:

"In the Kern Valley there is little difficulty in getting four cuts of good size and quality, and the same is probably true of the stronger soils as far north as Fresno, and southward in the valley of South California. In the Sacramento Valley three cuts can doubtless be obtained, at least when irrigation is employed or in naturally moist land. At Berkly and elsewhere on the immediate coast, two cuts (the second

usually a small one) is all that can be counted on; but in the warm valleys of the Coast Range doubtless from two to three full crops, according to the supply of moisture and the strength of the soil, may be looked for."

Mr. Dodge further states that in his opinion, two cuttings are possible in Texas and Louisiana, three in portions of Florida, and, as has already been stated by Professor Hilgard, from two to four cuttings in California. And since his visit to New Orleans, at the time of the official Ramie machine trials of 1894, he is convinced that two cuttings of second year's growth Ramie, when properly cultivated, will produce 20 tons of green stalks with their leaves, and it may be possible, under the most favorable conditions, to secure a yield of even 25 tons per year. The foregoing refers to long tons of 2,240 pounds each.

The amount of decorticated ribbons that can be produced on an acre is also diversely estimated, but from reports and information from the most authentic sources it is safe to presume that 2,000 pounds of dry ribbons will be the average yield under fair cultivation.

FERTILIZATION.

It is evident that such enormous yield, of any crop without some substantial aid to the soil, in the way of manure, must prove very exhaustive. A small percentage of the crop is fibre, and the leaves, which amount to 50 per cent. of the crop, and the stalks, after decortication, can be returned to the soil, and if understandingly prepared, would furnish nearly or quite the necessary fertilization required.

A fertilizer made by composting the offal (leaves and stalks after decortication) with Florida soft phosphates and the addition of a small amount of potash, would undoubtedly meet with all the requirements. The vegetable matter would in a short time become thoroughly decomposed and in a condition to be handled as easily as any commercial fertilizers, and it would also be found an excellent manure for other crops as well as Ramie.

ENEMIES.

As far as is known, Ramie has no destructive enemy to prey upon it, such as worms, parasites, etc., and from the nature of the plant it is not probable that it ever will have. If any damage has ever been done to the stalks it has not been perceptible, but were the destruction of the leaves as great as those caused by the cotton worm, it could result in no great damage to the stalks, and if it occurred near the time for harvest, it would greatly aid the process of decortication.

NOT SERIOUSLY AFFECTED BY DROUGHTS.

Ramie is a plant that is not seriously affected by drought, standing prolonged dry seasons far better than many of the staple crops of the South—cotton, for instance.

The following statement, furnished by Felix Fremercy, an active and zealous promoter of American fibre culture, forcibly illustrates the luxuriance with which Ramie grows in our Southern States, and its ability to withstand drought:

"In July, 1887, a Texas planter set out several thousand roots. The next spring each root sent forth thirty or forty sprouts which grew with rapidity. But early in July a drought began which lasted nine weeks. During this period, so great was the intensity of the heat that the soil was dried to a depth of more than two feet. Hundreds of thousands of cotton plants perished, but the Ramie survived the drought, and, quickened by the fall rains, grew with such luxuriance that often 150 stems were found in clusters not more than two feet in diameter. In one instance 168 stalks sprung from a single mass of roots. The plants grew so rapidly that, fourteen days after the cutting of the mature stems, the new sprouts were thirty inches high."

THE MACHINERY QUESTION.

Much has been said and written regarding Ramie and the fact is generally well understood, that the chief impediment which has stood in the way of the extensive cultivation of this plant for profit, outside of China, has been the want of machinery and processes for producing the fibre in a finished condition for the spinner at a minimum cost.

China and Japan are at present the only sources of supply for Ramie, where the fibre is decorticated by hand, a Chinese laborer producing no more than three pounds in a day. The price of Ramie ribbons is, therefore, high, and the supply entirely inadequate to the demand. The assertion has been made that the products of 100,000 spindles would not meet the wants of France alone. A few years ago Senator Feray publicly stated that the manufacturers of France were ready to make contracts with American planters for a supply of 20,000,000 pounds of Ramie a month.

The great demand and the constantly increasing popularity of this beautiful fibre has acted as an incentive to inventors to produce methods for the extraction of the fibre in large and paying quantities, further stimulus in this direction has been given by governments, corporations, and individuals, who have offered large prizes for the production of successful decorticators. The French Government offering $100,000, and the Indian Government $125,000, for a

solution of the problem. During the past twenty years more than 100 Ramie decorticators have been invented in this country and Europe, while many have shown some merit and gradual progress has been noted toward the solving of this difficult question, it is only within a recent date that complete and successful processes, both mechanical and of degumming, have been perfected.

In our own country, Mr. Samuel B. Allison, of New Orleans, La., a gentleman who has given the Ramie question his almost constant study for a long series of years, has produced a decorticator, and also a degumming process, that may be said to be an entire success. He now claims, and has already demonstrated in numerous public trials, being ready to prove it again to the satisfaction of the most skeptical, that he can produce Ramie fibre in a perfect and finished condition for manufacture, at less cost than sea island cotton can be produced for.

The following description of Allison's Improved Decorticator, or Machine No. 2, is taken Bulletin No. 32 of the Louisiana Experiment Stations:

"It consists of a series of pressure rollers, reciprocating brakes, rotary scutchings and combing devices combined with feed and off-bearing carriers mounted on a strong cast-iron frame. The Ramie stalks are fed into the machine by means of an endless feed carrier. The first set of rollers are corrugated, and crush and split the stems, the second are smooth and crush the stalks, back of the latter is a deflecting plate that turns the feed downward, when it meets again the action of a third set of smooth crushing rollers, which further reduce the stems and firmly hold and feed gradually to a reciprocating brake and scutching blades, where it is caught by a set of grip rollers. The rear end of the fibrous curtain as it descends is thrown out upon a set of deflecting plates and gradually drawn downward and one end subjected to the action of a set of scutching and combing cylinders, where the rear end is again subjected to the action of the first set of scutching cylinders. The fibrous curtain descends in a perpendicular, and both sides are acted upon, while the rear end as it descends is subjected to the action of both sets of scutching and combing cylinders and is delivered to the off-bearing carrier in ribbons."

Another machine, owned by the Textile Syndicate of London, England, has been shown to possess great merit, and to have the ability of performing the work of decortication rapidly and in a very satisfactory manner.

RAMIE MACHINE TRIALS.

The Allison machines and that of the Textile Syndicate, were tested in public trials, held at the Louisiana Sugar

Experiment Station, Audubon Park, New Orleans, La., in October and December, 1894.

The committee of experts appointed by the Station to conduct and witness the trials were as follows:

Hon. Charles Richards Dodge, Special Agent in charge of Fibre Investigations, United States Department of Agriculture.

Professor S. M. Tracy, Director Mississippi Experiment Station.

Dr. W. C. Stubbs, Director Louisiana Sugar Experiment Station.

The work performed by both machines was very satisfactory, and far in advance of that done by any machines heretofore produced, as the following extracts from the report of the committee will attest:

"The large Allison machine delivers its fibre in good condition and better cleaned, but its immense size and the power that it takes to run it, precludes the possibility of its being used in the field upon small experiments. In the small machine the size is considerably reduced without destroying its efficiency, in order to adapt its work to the field, and to be run by a smaller power.

"The committee desires to call special attention to the fact that in trials on green Ramie the stalks were not denuded of leaves, while in the trials of two years ago the stalks used by the three machines under test were required to be stripped. The Textile Syndicate machine without and the Allison machine with saturation, in the present tests ran continuously without gumming, fouling or breaking in any part, and gave evidence of ability to meet any demand in continuous running that might be made upon them."

It may be added that since the aforementioned trials took place, both machines have been materially improved, by reason of suggestions made at the time of the trials, and that the machine problem may be now considered well solved.

DEGUMMING PROCESSES.

There are several companies having degumming processes, and notably among these are the Jones & Warr Company, of Paterson, N. J.; the Perseverance Fibre Company, of New Orleans, La.; M. Favier, Valobre, France, and the Boyle Fibre Syndicate, of London, which proposes to operate in this country; all have their own process for treating the fibre and preparing it for manufacture, and will employ them in the near future.

RAMIE FIBRE AND ITS USES IN MANUFACTURE.

The fibre from Ramie is beautiful, long, silky and

strong, closely resembling silk in lustre and strength. It can be used as an adulterant or be entirely substitued for it in the manufacture of fine textiles. Goods like worsteds are made from it, and it forms an excellent adjunct to wool in the manufacture of fine cassimeres and woolens, improving the strength and appearance of these goods. Tablecloths, napkins, etc., are made from it that excel in lustre the best of Irish linen; also delicate laces, velvets, damasks, and brocades of brilliancy unsurpassed by any other material except it be silk. In fact, there is no end, apparently, of the uses to which this fibre can be put. It has three times the strength of Russian flax and double that of the best Holland, Belgian or Irish varieties.

In United States Department of Agriculture Fibre Report No. 7, Mr. Dodge has the following interesting statement of the use of Ramie fibre in manufacture:

"What are the goods manufactured? Regarding the work at Valobre, the Department is informed that it produces special threads for lace, passementerie, linen fabrics, and other products of a higher grade, in which the price of the materials is of less importance while waiting until the abundance and cheapness of the raw material will permit the introduction of threads for coarser goods for which there will be a large demand. For linen goods Ramie is particularly applicable on account of its great resistance, both with regard to washing and the wear. The most important hotels and railway companies of France are said to have entirely adopted the use of Ramie. The City of Paris has also adopted this linen for the service of it twenty arrondissements. It is ordered for the dressing of wounds in several hospitals, including those of the army and navy. The Minister of War employs it for the cordage of balloons, powder sacks, etc., and the Bank of France now uses nothing else for the manufacture of its notes but the Ramie supplied by the Valobre factory; it has been found the new bank note of Ramie to be finer, more durable and capable of receiving a better impression—consequently rendering forgery of the notes much more difficult, if not impossible.

"As to the possibilities of Ramie manufacture, there seems to be no limit. Stuffed goods for men's wear, upholstery, curtains, laces and embroideries, plushes and velvets, stockings, sheetings, sails, duck, carpets, cordage, fishing nets, and yarns and threads for various uses not enumerated."

RAMIE CAN SUPPLY THE PLACE OF MOST OF THE TEXTILE FIBRES NOW IMPORTED.

It is estimated that the annual importations into the United States of fibres, wool, worsteds and woolen goods,

silk and its manufactures, together with flax and linen goods, amount in round numbers to $150,000,000. Ramie fibre that can take the place of most of this, and largely with our products of wool and silk, equal or excel much of it in durability and finish.

PRICES AND COST OF PRODUCING FLAX.

Recent quotations show that it now costs $235 per ton to lay down Russian flax in New York, while the Holland, Belgian and Irish varieties are worth more than double that amount in Liverpool, they would cost in this country, duties paid, close to 30 cents per pound. The United States Consular Report for July, 1894, mentions flax as selling in Holland for £100 per ton, or little more than 23 cents per pound. The same report also places the actual cost of producing flax of all grades, the world over, to average 15 cents per pound.

SUPERIORITY OF RAMIE OVER FLAX.

Ramie fibre is far superior to flax in every respect, and is capable of being converted into all classes of goods that are now made from flax. It is the opinion of those who are qualified to express themselves understandingly on this subject, that when Ramie fibre can be produced in sufficient quantities it will entirely supplant flax and stop its cultivation.

RAMIE FIBRE PECULIAR TO ITSELF.

Ramie fibre is unique in itself, and possesses qualities found in no other fibre of either the animal or vegetable kingdom. The great resistant powers of Ramie and its ability withstands the effects of water without shrinking, stretching or rotting, will, no doubt, cause it to find its way into many special articles of manufacture, when its abundant production shall make this admissible. The non-rotting powers of Ramie will make it exceedingly valuable for roof covering and similar articles, to be used in like exposed situations. It has already been used for sail cloth for yachts where expense was a matter of secondary consideration, as in the case of the contestants for the "America's Cup," in the great international yacht races of 1895, both "Defender" and "Valkyrie III" used sails made wholly or in part from Ramie cloth. In fact, as has been previously stated, the possibilities of Ramie are practically without limitation.

OVERPRODUCTION.

Overproduction with Ramie, as is the frequent occurrence with perishable fruits and many other commodities,

will at least be impossible, and no fears ever need be in the way from this cause. A gentleman who recently visited New Orleans, in the interest of Northern capital, to investigate Mr. Allison's inventions, in an interview published in the New Orleans Picayune, expressed himself as follows on the question of overproduction: "As to the market for Ramie fibre, you may turn your entire cotton acreage into Ramie and yet fail to supply the $300,000,000 worth that foreign and American manufacturers will use as soon as they can depend upon a regular supply. There is no guess work about this. The English Government has stated that such an amount in value would be required. You must remember that China has hitherto supplied the world practically, but the English, French and Austrian factories are unable to get it as required. With Mr. Allison's machine in general use, the Chinese cannot compete in amount, quality or price. The best Ramie known grows in the Southern Gulf States."

FLORIDA SOIL AND CLIMATE ADAPTED TO RAMIE.

The soil and climate of South Florida is pre-eminently suited to the successful cultivation of Ramie. As has been previously stated, the requirements, to insure best results, being a light sandy or alluvial soil. A large proportion of the State may be said to be a vast alluvial deposit, of great fertility, as is evidenced by the magnificent crops of all descriptions that are so easily produced. The vast areas of saw grass, muck and low flat-woods lands that can be easily drained, would be the par excellence of Ramie lands. These lands are not easily affected by drought, and the growth of the plant would be continuous, or nearly so, as there are only short intervals that its growth would be retarded from any cause in the southern half of Peninsula Florida. The lands of Florida are easy of cultivation, one horse or mule being able to perform as much work as three in many of the agricultural districts of the country.

The climate of Florida, as adapted to the successful cultivation of Ramie, may be said to be equally as propitious as the soil, being warm and humid, with rare extremes of cold, to do injury, south of the 28th degree of north latitude. In this portion of the State, three crops of Ramie would always be assured, and in a majority of years, four crops would be obtained. By reason of its peculiar maritime situation, the climate of Peninsula Florida is naturally moist, and prolonged visitations of drought, as are frequent in the more inland situations of the country, are unknown. In probably no State of the Union is the rainfall more evenly distributed and regular than in Florida; hence the reason of

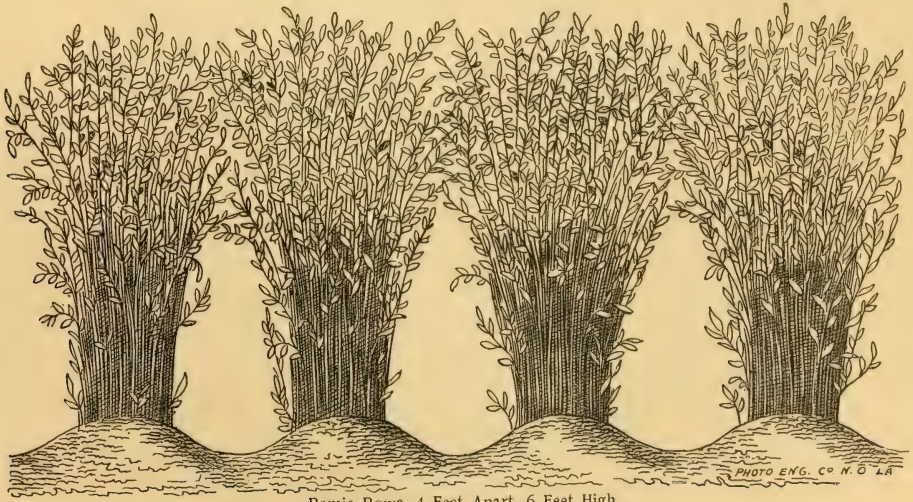
no excessive floods or prolonged dry seasons, to cause injury to growing crops. From the foregoing it may fairly be assumed that in no other part of the country where Ramie has been cultivated are the conditions more favorable for success with it than in South Florida.

RAMIE A HIGHLY PROFITABLE CROP FOR FLORIDA.

There is probably no crop that can be grown in Florida soil that can be made more remunerative, and with less cost of labor and anxiety, than Ramie. In point of labor, it is the most inexpensive of all crops to produce one planting lasting for a long term of years, and with proper cultivation and suitable returns made to the soil, it would be practically inexhaustible. The cultivation of Ramie is an industry that small farmers may take up with the most flattering promises of success. Ramie has been said to be pre-eminently a poor man's crop, with no more difficulties and expense attending its cultivation than the management of a crop of corn. With twenty acres of Ramie, a Florida farmer would have a certain and constant source of income that should make him one of the most independent of that class who obtain their livelihood by agricultural pursuits.

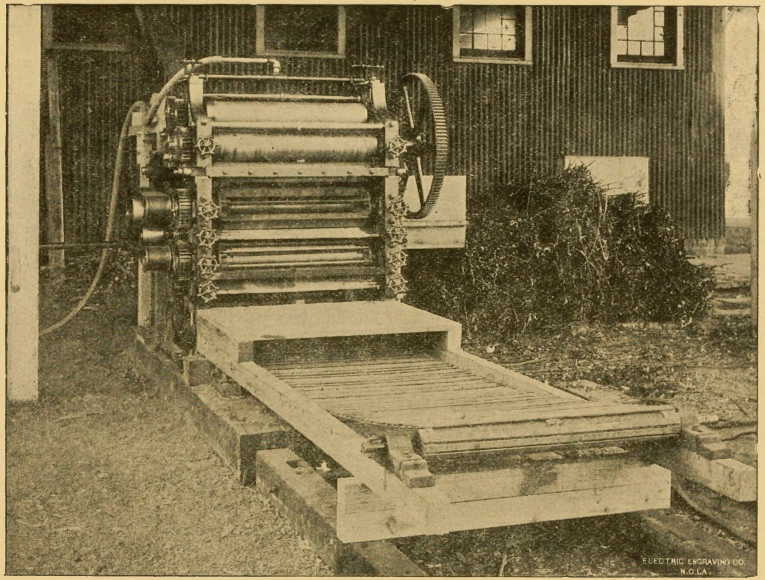
The cultivation of Ramie is destined to become an important Florida industry and a great source of wealth to the State. The time was never more opportune than the present for farmers to secure a few roots and seeds and commence the propagation of roots and plants for larger operations, and at the same time make themselves familiar with the best methods of cultivation.

Top of Ramie Plant, Showing Seeds.

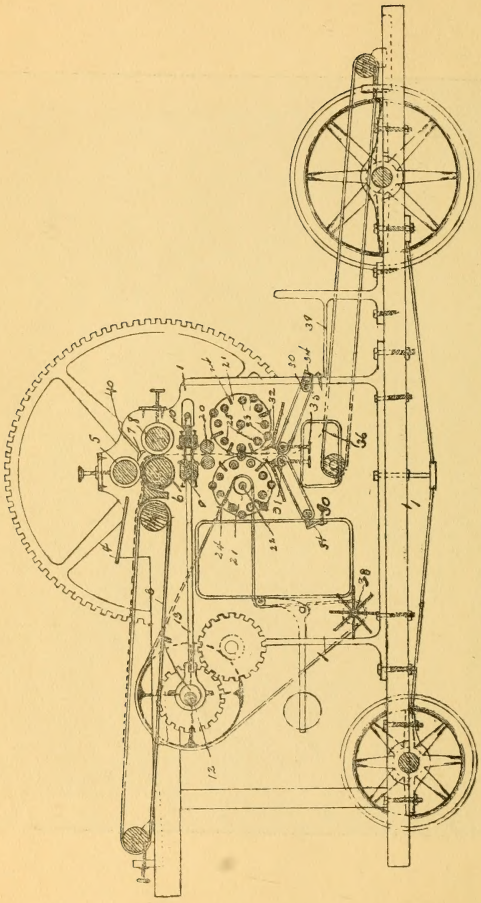


Ramie Rows, 4 Feet Apart, 6 Feet High.

Leaf of Ramie Plant.



Allison Decorticating Machine No. 1.



Allison's Improved Decorticator No. 2.