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SILVICULTURAL PROSPECTS OF THE ISLAND
OF CUBA.

By John Gifford.

Reprint from The Forester, Vol.VI,
No. 8, August 1900.

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SILVICULTURAL PROSPECTS OF THE ISLAND OF CUBA.

~~Withycombe~~ ~~McMurry~~

BY JOHN GIFFORD.

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AN AVENUE OF ROYAL PALMS AND AN AMERICAN ENCAMPMENT IN CUBA.

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SILVICULTURAL PROSPECTS OF THE ISLAND OF CUBA.

BY JOHN GIFFORD.

It is my intention in this paper to emphasize the great advantages of southern countries in the production of wood and other forest products, and the great need of a botanic garden and experimental station in either Cuba or Porto Rico.

It seems to me that the two most important factors which determine the financial profits of forestry are location in reference to markets, and the ability to produce quickly materials for which there is demand. There are other profits of course which cannot be measured in dollars and cents, but these are more or less local and, although important, must be considered in a special way for each locality. The most important points are to produce quickly what you sell, and to sell quickly what you produce. It is of course self-evident that the nearer one operates to a great market the more intensive may be the system of management and the larger will be the profits. This statement, however, was far more applicable in times past than at present. The abundance of other materials such as coal, iron and stone modify this condition. By modern transportation with special long-distance freight rates, distances have been shortened, time saved, and regions which were formerly inaccessible brought comparatively near. In consequence the pinch of want is not seriously felt until the forest resources of the remotest corners of our land are exhausted. Even then unless hindered by tariff barriers the deficiency may be supplied by neighboring countries. Shingles from Oregon, Yellow Pine from Georgia, and White Pine from Minnesota

may all be bought at reasonable prices in almost every country lumber yard. Yellow Pine floors are common in Europe; wood from California is common in the Orient; and even the ties of the railroads in the diamond mines of Kimberley are Pacific Redwood. This is of course all due to modern transportation, so that after all location is not the most important factor. In Cuba the great difficulty is the lack of communication. It is as easy to go from Santiago to Havana by way of New York, as it is by land or even by water in Cuba. Later when railroads are built the conditions throughout the island will be much more uniform.

It seems to me that silviculture in its intensive form is not only the concomitant but the consequence of agriculture. It belongs, therefore, more to the populated and cultivated regions of the earth than to the wild remoter regions. In its more extensive form it is of course more or less applicable to remoter regions, in fact to all regions where wood will grow and where wood has value. But the law of diminishing return applies as much to forestry as to other industries and in a country so vast and undeveloped as the United States it is not difficult at present to find regions where the profits are not equal to the cost of protection and intelligent supervision, the primary essentials of forestry.

I refer only to private holdings and it is my intention to discuss only the possibilities of the practice of intensive silviculture by private persons in Cuba. Both this island and Porto Rico are practically de-

void of good timber and the time is at hand when it will pay to plant trees as a crop in these islands. At the same time it is surprising how well certain peoples manage without wood. The houses of the rich in Cuba are of stone; of the poor of thatch. In Italy even vine props are cut from solid granite.

Although Cuba has suffered in many ways she is not in a wild and semi-barbaric state. Although hampered by strife and oppression she has been under a fair state of cultivation for many years. Cuba was blooming when a large part of this country was an unexplored wilderness. Her sugar and tobacco industries have been famous for many years, and although she is comparatively rich she is no longer an immense mine of resources. The forests of a large part of the island have been long ago exhausted, and the same would have happened to the remainder had they been accessible. Even these are thin, having been culled of their richest hardwoods. The time is certainly ripe for tree planting in Cuba. I know of no place where a person could plant forests with more assurance of profit than in this island.

I say assurance of profit, because the second factor mentioned at the beginning of this paper, namely, "the ability to produce quickly materials for which there is a demand" reaches its maximum in the moist regions of this island. The time element is the greatest drawback to forestry. The farther north one lives the longer one must wait. The farther north, the fewer the resources and the smaller the population, until of course a point is reached where nothing can grow and no man can live. Not only do trees grow much more quickly in the South, but the number of species is larger. They may not grow on the whole much faster than trees of temperate climes, but they grow longer. Except for a few weeks each year the growth is constant. Waiting 200 years for a Spruce tree is not only discouraging to the private planter, but simply out of the question. The demand for Spruce may cease altogether in that length of time. A nation may rise and fall in a couple of centuries. Machinery and

methods of manufacture may change completely. How different the conditions in a warm climate where Eucalyptus trees, for instance, reach the height of one hundred feet in ten years! For the greatest amount of profit we should plant not only quick growers, but plant in regions where the quick growers grow quickest.

We should also, it seems to me, consider silvicultural qualities first in the choice of species. By silvicultural qualities I mean rapidity of growth, ease of propagation, and freedom from disease. These are often much more important than the quality of the wood. Twenty years hence we shall not be so particular about the kinds of woods we use. It is wood we want, and if defective, defects may be remedied. In these days of antisepsis there is no more reason for rot in wood than for gangrene in wounds. Good and bad woods are only comparative terms, and I find that in countries where wood is scarce there is much less fashion and fastidiousness in reference to kinds. Owing to the fact that trees grow with great rapidity along our Eastern Coast from New York southward, it seems to be a hopeful region for the development of forest farms such as already practically exist on the Eastern Shore of Virginia, where the pine leaves are highly valued as manure in the cultivation of the sweet potato. Of all this southern region, however, Cuba offers the greatest advantages because of her lack of wood, of her need of it, of the great variety of useful woods which will grow there, and because of the rapidity with which, owing to the climate and fertility of the soil, they will grow.

Frost is always a menace to both forestry and agriculture. One is not absolutely free from it until he reaches the latitude of Cuba. The slightest touch of it is fatal to many valuable plants, so in order to be safe it is best to go well south when you go south. The orange growers of Florida have learned this from several very frosty experiences.

We ordinarily under-rate Cuba, especially her size. Many New Yorkers compare her with Long Island. Long Island

however is only a little larger than the Isle of Pines, which is a very small and unknown part of Cuba. Although it is a separate island I call it a part of Cuba because it belongs to the Department of Havana. The Isle of Pines alone is 160 square miles larger than the state of Rhode Island. Cuba is as large as the State of New York. It is almost four times as large as Holland and three times as large as Switzerland. It is 730 miles long and from 90 to 20 miles wide and contains over 45,000 square miles. The English island of Barbadoes contains only 166 square miles and supports a population of 170,000, almost 1,000 per square mile. If Cuba is capable of supporting only half that number she will hold over 20,000,000 of people. Java is only a little larger than Cuba. It supports 20,000,000 and is still under-populated, although more densely peopled than Belgium. Cuba is in need of people of the white race—people from Southern Europe. Prosperity in the Tropics is dependent upon workers. They must exist in proportion to the natural resources of the country. The great influx of peasants from Spain is of great benefit to the island. The Portuguese are unexcelled workers in the Tropics. These people can stand an immense amount of heat, and can work in the tropical sun to much better advantage than the negro. The statements that the white man cannot live and be healthy in the Tropics is a great mistake. The condition of Cuba has been unsanitary, but the climate aside from man's interference is on the whole more healthful although not as varied and perhaps not as pleasant as a temperate climate. One must sweat in the Tropics to escape lethargy which leads to unhealthfulness. When the population becomes more dense, and nature less bounteous, men will have to work for the necessities of life. The general tone and healthfulness of the country will then be better. The statement that a high state of civilization cannot be reached in a tropical climate is contrary to the records of history and archæology. The main difficulty to-day in the American Tropics is under-population and in conse-

quence a scarcity of labor. Planters were searching in vain for laborers in the tobacco fields last spring. Fortunately forestry requires a small amount of labor per acre in comparison with agriculture.

Cuba is well located. It is the largest of the Greater Antilles.—It is near to the Mexican and American coast. It commands three important gate-ways, the straits of Florida, the Windward Passage, and the Yucatecan Channel. The construction of an inter-oceanic canal would add much to the importance of the island.

In riding through Cuba one is not very favorably impressed with the appearance of a large part of it. Cuba looks forlorn and devastated. Bloodshed and oppression have not affected her fertile soil. The deep rich red earth is resting, waiting for the influx of new blood and new ways. It responds to the slightest touch of cultivation. Its possibilities are indeed unknown and almost limitless. In addition to many native West Indian trees, there are many more in other tropical regions of the globe which might be profitably introduced. One of the greatest benefits ever conferred by Great Britain in her colonial work was the introduction of seeds of many trees from the East Indies into her West Indian possessions.

I have no doubt also that many of our northern species will grow well in Cuba. In fact it is more than likely that several of our northern tree species will not only grow but grow better than in their native land. The Poplars, Chestnut, Locust, Walnut, Willows and other trees of other countries may flourish in its fertile soil. They will grow in southern Italy. Why not in Cuba? In fact Cuba is peculiar in this respect. Northern crops such as potatoes grow well by the side of pine-apples and other tropical products. Here is an excellent field for experimentation. For this purpose a botanical garden and experimental station are necessary. The sooner the better, for every year means much to the prosperity of this island. In this respect we should emulate the Dutch in Java and the English in India and Jamaica.

I say "we" because I believe and hope at least that American influence has come

to stay in Cuba. It matters little to a work of this kind whether the island is absolutely independent, under our protection in the form of a protectorate, or annexed to this country. The people of the United States and especially the people who have charge of affairs, also the better element of Cubans and the other foreigners who have interests in the island have fully determined that henceforth it must be healthful and peaceful. Even if the country becomes absolutely independent, American influence will be paramount and we should always under all circumstances be willing to lend a helping hand to aid the Cubans to bring their island to the highest pitch of productiveness. In no way could we better foster this work than by aiding in the establishment of an economic Botanical Garden similar to the famous Buitenzorg of Java and the Hope Gardens and Plantations of Jamaica. We could well afford to do this not so much for Cuba as for ourselves. The Tropics are biological headquarters. It is there where growth is most intense and where many physiological problems may be most easily solved. The study of vegetation for instance in a country where cold does not exist may render clearer the important question of frost. It is often in studying the condition of a country in which an evil does not exist that its cause and cure may be more easily understood. It would be an excellent place for northern botanists to go for a few weeks or months, just as Buitenzorg has been for many years the Mecca of European botanists. So important in fact has a visit to Buitenzorg been regarded that at least two European governments have aided botanists financially in order that they might study there. Its effects may be seen in the writings of Goebel, Schimper, Haberlandt and others. The importance of marine biological laboratories such as Naples, has long been recognized and at one time the construction of a similar establishment in Jamaica or the Bahamas was seriously considered. In Cuba there is also an excellent opportunity in the coral islands near Batabano and the Isle of Pines, which is only a short distance from Havana. It might be pos-

sible to combine these enterprises under the direction of one or several of our universities. Such a cause has the right to expect liberal financial aid from both this and the Cuban governments.

In the agricultural college in Wageningen in Holland there is a department of forestry. The students there are being trained not so much for work in Holland as in Java, where they are needed in the Teak forests. Much of the wealth of Holland was not made from cheese, but from the chocolate, coffee, spices and tobacco of the Indies. The same may be said of the English and the forestry school at Cooper's Hill. One need not visit Java to see work of this kind. It is in progress in Jamaica, which, on a clear day, is visible from the mountain peaks of Cuba. There one may see many interesting experiments with trees and plants from all parts of the world. We must not fail to bear in mind that an institution of this kind, even if conducted at great expense, pays for itself many times over if it simply introduces a profitable crop into the country, or even improves the quality of a native crop. The institution which produces a variety of cane for instance which yields a small degree more of sugar adds in the aggregate much to the productiveness of a country such as Cuba. The Gardens of Jamaica not only introduce new species and varieties for experiment but distribute young plants gratis or at cost price throughout the island to enterprising farmers. The plantation of Cinchona and Eucalyptus trees in the Blue Mountains are examples of its industry.

Then again much can be done in experimenting in reference to the growing of the crop. Owing to the inconvenient time element in the production of rubber and camphor, experiments are in progress to determine whether these trees cannot be grown as field crops. The seeds are sown and the young plants harvested, and from these the juices are extracted by special machinery. Perhaps some day our paper pulp may be produced in the same way. In a southern climate a field of Poplars or Willows, two years old would produce a large quantity of pulp.

In the tropics agriculture and forestry blend. Shelter trees are necessary. In several instances the planter strives to grow his crops under forest conditions. Chocolate, coffee, pimento, etc., grow better in the shade of other trees. Often such crops are planted in the virgin forest from which the underbrush has been cut. Shelter trees are necessary to protect tender crops from the fierceness of the sun, the gales and heavy down-pours of rain. They protect and enrich the soil and produce the forest condition such as these trees enjoy in their wild state. When northern crops are grown in Cuba they must be sheltered, and almost all northern species when brought to the South, although they may need all the sunshine they can get in the North, grow well in the shade.

Perhaps the best system of general culture for Cuba would be the kind in use in Italy. Although a very small portion of Italy is forested it appears covered with trees, except in the mountainous districts where they are most needed. There are no broad fields. All cultivation is done between rows of trees which serve for shelter and at the same time yield nuts, fruits, olives, willow-withes, fodder, props for vines, fuel and boards.

The tropical forest is very unlike the northern woods. It is in fact often disappointing. It is more irregular in form and the light is a dazzling reflected kind quite unlike the mild transmitted light of northern woods. This is, however, not always so. There is a sharper struggle for light and space, and weeds are more vigorous and pestiferous. There is enormous vegetative activity. There is a lack of periodicity of leaf-fall and a lack of protective adaptations against cold.

Owing to the lack of proper means of communication in Cuba there is a lack of wood in certain districts especially in the tobacco and sugar regions. It is not my

intention in this connection to more than mention the possibilities in the line of rubber, gums, dyes, medicines, chocolate, precious woods, spices and other forest products. It is my intention simply to emphasize the demand for fuel wood, charcoal, tobacco poles and fence materials, and to express the opinion that they may be planted with profit in Cuba.

Wood is used to a certain extent by the locomotives and industrial establishments in Cuba, but charcoal, the fuel par excellence for tropical countries, is most in demand for house use. It does not necessitate the use of a stove or the construction

A FOREST SCENE IN CUBA.

of chimneys. A brazier is all that is necessary. Were it not so bulky in proportion to its weight and fuel value it would no doubt pay to export it.

I am convinced that certain species of Eucalyptus will grow with magical rapidity in Cuba and in a surprisingly short time produce poles which will be fit for charcoal and for racks on which to cure tobacco. Another great good may at the same time be accomplished by planting

this tree in the malarial districts. There seems to be little reason for doubting its efficiency in improving the healthfulness of these districts, although it is often disputed. Just what it does is not known but it has without doubt improved the condition of several tropical countries in which it has been planted for this purpose. In the light of modern discoveries as to the cause of malaria, and the manner of its transmission, the Eucalyptus probably has no direct effect. It seems that a special genus of mosquitoes carry the protozoa of malaria from the water to the individual. The Eucalyptus probably accomplishes its good work by sucking the water out of the soil and thus depriving the mosquito and the malarial parasite of their breeding place. The amount of water transpired by these trees is immense, in fact in calcareous soils where drainage is difficult owing to pockets in the rock, it is the easiest and most efficient method.

Cuba is a great cattle country, and there is a great demand in consequence for fence materials. The fences which now exist consist mainly of barbed wire, propped up with all kinds of sticks and patched up with hedges of various kinds. Most of this was bought by the Spanish government for another purpose; it is doing good work at last, however, in aiding the cattle industry of the country. Good posts are needed, and no doubt many of the native woods are excellent for this purpose. The Logwood, which yields a valuable dye, is excellent for hedges. The Chestnut and Locust might be grown with profit for the purpose. The Locust might escape the borer in Cuba as in southern California.

Grass grows well in Cuba in the shade of trees, and the growing of trees, especially the Eucalyptus, and cattle raising are not incompatible. The shade is of great benefit to the cattle, and after the trees have reached a few feet in height the cattle do little injury. The Eucalypts any way throw very little shade owing to the fact that their leaves are edge to the sun.

Cuba will soon need large quantities of crates, boxes and baskets. These can be

much more profitably imported in the knockdown from this country, except the cigar box, for which the West Indian Cedar (*Credrela odorata*) is the wood of woods. Cedar and Mahogany are near relatives. Both belong to the order Meliaceæ, which is a group of broad-leaved, quick-growing trees. I hope for the time when these trees may be systematically planted in Cuba. In Jamaica this Cedar is dotted over pastures and along water-courses. It grows to a large size and produces a handsome durable wood which has been extensively used for furniture, shingles and ornamental work. Cuban Cedar is extensively used in this country in the manufacture of high grade boats. The Mahogany proper is the wood of all woods, and can be easily grown in Cuba.

Conifers are not common in the Tropics. This is no great disadvantage. From a silvicultural standpoint, especially as far as the soil is concerned, there is little reason for the encouragement of conifers where quick-growing broad-leaved species will grow. In certain parts of Cuba, especially Pinar del Rio and the Isle of Pines, *Pinus Cubensis* is common. It usually grows in the poorest soils. It may be found on dry obsidian ridges in Guatemala and Honduras and on coral rock in the Bahamas, where it was formerly known by *Pinus Bahamensis*. Pines are usually not common in tropical climes, although there are several species such as *Pinus Pinea* which cannot endure a little cold. No doubt there are several species of conifers which will grow well in Cuba. Their scarcity in tropical countries is probably not because they do not like the climate, but because they are overwhelmed and crowded out by broad-leaved kinds. There are, however, near relatives of the Pines which thrive in the Tropics and produce excellent woods such as the Podocarpus.

It seems strange that some of the slowest growing and hardest woods of the world are produced in the tropical climates: *Lignumvitæ* for instance, which is extensively shipped from Cuba. Close by their side may be found, however, rapid growers. The truth is that there are rapid and fast-growing kinds in al-

most all parts of the world. Slow growing or fast growing seems to be, to a certain extent at least, an inherent specific quality. The rate of growth may be slightly changed by changing the environment, but ordinarily a slow grower is a slow grower even under the most favorable conditions. There are in Cuba a large proportion of rapid growers, quite as many I believe in proportion to the number of species as exist in temperate climates.

The soil of Cuba is fertile, her climate is good, and her location is excellent. As an instance of the productivity of the soil I might mention that cane once properly planted is good for twenty years. In Louisiana it is planted almost every two or three years.

Her beauty and quaintness are equal to that of southern Spain and Morocco. The north shore, which is the pleasantest part, is within seventy hours of New York City. The northern shore of Cuba will some day be the Riviera of America. The amount of material which has been produced in Cuba in times past is

immense. The surface of the soil has been merely scratched with imperfect ploughs. A large proportion of the land is level or rolling and easily cultivated. In addition there are vast mountainous regions capable of supporting magnificent forests. In the Tropics however it is more difficult to classify land than in the temperate regions. The choicest fruits are often produced in the unlikeliest spots. The soil is generally good. A soil which is barren in the North may be exceedingly productive in the Tropics. Humification is also much more rapid. Peat never accumulates owing to the rapidity of the decomposition of organic matter. This is due of course mainly to the climate but also to an abundant fauna of the soil which ventilates it, and thus hastens humification. What Cuba needs above all things is a botanic garden and forestal and agricultural experimental station to demonstrate her possibilities. Although no longer the brightest jewel in the crown of Isabella she is still the gem of the Antilles, the most promising island of the American Tropics.

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