A READING PROJECT

TOBACCO GROWING IN THE WEST INDIES

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It appears that tobacco cultivation was begun in the West Indies in the seventeenth century. Many changes have been witnessed since its inception, and former important producers like the Leeward Islands and Barbados have since discontinued production. Small quantities are produced mainly for local consumption in Br. Honduras, Br. Guiana, Trinidad and the Windward Islands. It is in the larger islands of Cuba, Jamaica and Puerto Rico that the industry assumes a major economical role.

Cultural systems in the area are in general of a similar pattern, but while standards in certain parts of the larger producing islands are considered high, in many cases, especially where grown by peasants, the methods employed leave room for a great deal of improvement.

Greatest attention has been paid to the production of cigar tobacco, and Cuban and Jamaican cigars have, attained a high standard and are renowned the world over for their excellent quality. Cuba is the principal producer of shade grown wrapper leaf in the area, the other islands being almost wholly dependent upon imported supplies. Cigarette leaf tobacco is grown in Cuba and Puerto Rico for manufacturing purposes but not to any appreciable extent in the B.W.I., experiments are in progress however to determine whether its production is worthwhile. Results continue to be encouraging.

The U.S.A. is the principal market for the tobacco products of Cuba and Puerto Rico, while the bulk of the Jamaica produce is exported to the U.K. Quite recently however the Jamaican cigars have been receiving severe competition on the U.K. market from Cuban cigars and as a result exports to this market have declined substantially.
Appreciable quantities of cigarettes and unmanufactured leaf are imported into Puerto Rico from the U.S.A., a small quantity of leaf from this source being also utilised in the B.W.I. for the manufacture of cigarettes, most of which are consumed locally, but by far the largest supplies of leaf for this purpose are obtained from Canada.

Tobacco was introduced into England by Raleigh in 1586 and since then its use has spread mainly through the channels of trade to all parts of the world. (1)

There is good evidence to believe that cultivation of tobacco in the West Indies dates back to the early seventeenth century, but it is not possible to state with precision the year in which it was begun. Some authorities however state that tobacco was cultivated in the Antilles long before their discovery by the Spaniards. (4)

The name "Cuban Tobacco" is often made mention of, which leads one to think in terms of an indigenous variety. In view of the fact that tobacco is said to have originated in the Americas, it is not unreasonable to assume that tobacco is also indigenous in the island's "off the main". After the ten years war used of Mexico and the States was introduced into Cuba. These varieties have become mixed to such an extent that the original type cannot now be recognised, although in that which has been evolved, the characteristics of the tobacco of Mexico and the States are predominant. (5)

Tobacco is claimed to be indigenous to the island of Puerto Rico, but its cultivation was not legally permitted until in 1634. (4) Apparently the sale of tobacco to foreigners was strictly prohibited in the early years of its cultivation but production was sufficiently large to permit some exportation in 1836. Since the American occupation in 1898 the industry has expanded considerably and now ranks second in the island. (6)

It appears that the first attempt by the English to cultivate tobacco in the West Indies was made between 1604-1606 when Sir Walter Raleigh tried planting on a small scale on the banks of the Cayo River
INTRODUCTION

I. HISTORICAL BACKGROUND

Most authorities are agreed that the continent of America is the native home of the tobacco plant, and Columbus, when he discovered the continent found the plant being grown by the American Indians who used the leaves for smoking, chewing and snuffing. The plant was introduced into England by Raleigh in 1586 and since then its use has spread mainly through the channels of trade to all parts of the world. (3)

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It appears that the first attempt by the English to cultivate tobacco in the West Indies was made between 1604-1606 when Sir Oleiph Leigh tried planting on a small scale on the banks of the Cayapok River
in Guiana. (7) Since then although the industry has been carried on in other parts of the British West Indies it has never attained any great importance in that country.

As early as 1625 tobacco was cultivated in Barbados and the Leeward Islands and was grown successfully enough to endanger the prosperity of Bermuda and Virginia, the pioneer producers of tobacco. (8) It is known that around this time tobacco of fine quality was being grown in Trinidad and Tobago where an appreciable but contraband trade was carried on. This trade was soon discontinued and cultivation diminished. Recovery of the industry was rendered even more remote with the growth of the industry in other islands. By 1639 European markets had become so glutted that prices showed an alarming fall. It was therefore decided to abandon tobacco and concentrate on the production of sugar. (9) Since then tobacco has never been grown on a widespread commercial scale in Trinidad and Tobago, although the crop is grown in isolated areas mostly by peasants whose standards of cultivation are generally low. Since 1923 tobacco has been cultivated at the Imperial College of Tropical Agriculture, partly for demonstration to students, and partly because it has proved a paying crop inspite of adverse criticisms on its quality. (10) The industry has apparently never been revived in either Barbados or the Leeward Islands.

From the time of the Arawak Indians "creole" tobacco has been cultivated in Jamaica and from then on almost entirely by peasants, principally for the manufacture of Rope tobacco, popularly known as "Jackass Rope". (11) The cultivation of cigar leaf tobacco began in 1896 when at the end of the great revolution a family of Cuban exiles sought refuge in the island. Production was at first slow and in 1936 a scheme was instituted by the Government for the extension of the industry, and an expert was appointed to organise the industry and supervise the preparation and marketing of the leaf. Great improvements have since taken place and success has been reflected in the prominence of tobacco manufactures in the island's exports. (12)
II. THE TOBACCO TRADE OF THE WEST INDIES

Tobacco has for many years played a prominent role in the economy of the Caribbean. As with many other commodities the raw material is in many cases exported and the manufactured product imported. (45) In some of the islands although tobacco is not produced, or only to a small extent, considerable quantities are imported mainly for manufacturing purposes.

Great strides have been made in the industry within the past twenty years and particularly to be noted is the great expansion of the export trade in Jamaica. In 1940 this trade was valued at £22,000 and rose to a peak of £905,600 in 1949. Quite recently however Cuban cigars have been offering severe competition to Jamaican cigars on the U.K. market; as a result exports in 1952, decreased to £600,000, and production is likely to be curtailed in the future if the position is not altered. (15)

The tobacco trade in Cuba accounts for about 10% of the island's exports, the U.S.A. being the principal market, exports to that country amounting to some 83% of the island's tobacco exports in 1950. (17) The main feature of this trade are Havana cigars renowned the world over for their fine quality. (26)

In Puerto Rico the tobacco industry accounts for a major proportion of the island's exports, the greater part being marketed in the U.S.A. (16, 19)

Of the other islands there is little export due undoubtedly to the small demand by overseas markets.

Appreciable quantities of leaf are imported into the area to be manufactured into cigarettes mainly for local consumption. Factories sponsored by the West Indian Tobacco Company are in operation in Jamaica, Trinidad, Br. Guiana and Barbados, while independently owned factories are operated in the Windward Islands. Formerly imports of manufactured leaf came mostly from the U.S.A. but Canada has greatly

replaced/
replaced this source as a supplier of leaf to the West Indian market.

(45) By far the majority of cigarettes imported into the area come from the U.K. Smaller quantities being obtained from the U.S.A.

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Tobacco cultivation in the island however has been long existent and one often hears mention made of "Cuban" tobacco which refers to the original type grown on the island. (5) The term is apparently being meaningless today, as seed from Mexico and the States was later introduced and undoubtedly mixed running of the varieties occurred. The hybrid condition has survived and appears to have flourished under Cuban conditions to render the quality of tobacco one of the finest in the world.

II. TYPES OF TOBACCO CROPS

Five separate types of tobacco from different growing regions are recognized by the trade being from West to East:

1. Vealta Abojo
2. Bent Vealta
3. Partido
4. Havanilta
5. Oriansa

These regions are again subdivided into districts in each of which the tobacco has more or less uniform characteristics. Most of the crop is produced on small farms known as Vegas. (14) Vealta Abojo tobacco is grown in the eastern part of the island in the Pinar del Rio Region and is the finest tobacco in the country. The leaf is aromatic yet mild and has a bright brown colour and is largely used for the manufacture of cigars. This region is divided into eight districts, the finest leaf being produced in the San Juan and San Luis districts on the lowlands of the south west. Much of the tobacco
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II. TYPES OF TOBACCO GROWN

Five separate types of tobacco from different growing regions are recognised by the trade being from West to East:  
1. Vuelta Abajo  
2. Semi Vuelta  
3. Partido  
4. Remedios  
5. Oriente

These regions are again subdivided into districts in each of which the tobacco has more or less uniform characteristics. Most of the crop is produced on small farms known as Vegas. (18) Vuelta Abajo tobacco is grown in the western part of the island in the Pinar del Rio Region and is the finest tobacco in the country. The leaf is aromatic yet mild and has a bright brown colour and is largely used for the manufacture of cigars. This region is divided into eight districts, the finest leaf being produced in the San Juan and Sen Luis districts on the lowlands of the south west. Much of the tobacco

in/
in this region is grown under shade and is used for cigar wrappers, but by far the most shade grown leaf is grown in the Partido region. The Semi Vuelta region adjoins the Vuelta Abajo on the east; the leaf produced in this region has a heavier body and stronger aroma than that in the former region but is in great demand by the United States for blending with other leaf in the manufacture of cigars. (17)

III. CULTURAL METHODS

(i) Soil

The soils of the island appear to be variable and different types of tobacco are associated with particular regions. Best Cuban wrapper is produced in clay loam soils developed over limestone while filler type is grown on a soil with a higher sand content.

In the Pinar del Rio province Vuelta Abajo tobacco is grown either on ridges or depressions. While the soils of the ridges appear to be a light loam and is considered a better tobacco soil, those of the depressions are generally of a heavier character and produce an inferior grade of tobacco. (1)

(ii) Seed-beds

Seed-beds are generally sited on a well drained area which is situated close to the field. The land is ploughed and harrowed until brought to a fine tilth. Three feet wide beds are then made with furrows 12 x 6 inches between and laid so as to be equally suitable for drainage and irrigation. Care is taken to remove all debris and undecayed vegetable matter from the top layer of the bed and a fertiliser mixture may be incorporated some days before planting.

The beds are usually sterilised mainly for the purpose of destroying various seed-bed pests. Three distinct methods are practised in Cuba:

1. Hot water or steam: Soil wet to a depth of about 2 inches by sprinkling or through passage of steam. The area is generally gone over twice in this fashion.
Chemicals: Formaldehyde mixed with water (1:25)

This is sprinkled over the beds, or in the production of 

**Dry heat:** Brush wood or grass burnt on top of beds, not without where machinery available, alcohol or gasolene may

height of six be used. cheesecloth stretched over the wires attached

Winds and rain are often heavy during the months of October and November and to offset certain damage coverings are erected over the beds. Stakes are driven in at the edges of the bed at 20 feet apart to leave ten inches out of the ground. Other stakes 36 inches in height are driven into the centre of the bed. Wires are clamped onto these stakes over which muslin is stretched and secured to wires attached lower down on the stakes. The effect is such as to break the force of heavy showers yet allow sufficient water to pass through. Coverings are removed as soon as the plants are hardy enough to be exposed to the weather.

(iii) **Sowing**

The seed is usually sown by hand but often results in an uneven stand. In many areas the seed is sown by machine or finely by hand in drills one inch apart taking care to press the beds by using either a roller or a flat board. As the seeds germinate the plants are thinned out by dragging a broad toothed rake with teeth one inch apart across the bed. Where a cheap supply of labour is available prickling out into another bed is done.

(iv) **Field Preparation**

As tobacco is grown on the same field for several years in succession it is customary either to leave the land in seed fallow or planted with legumes. The usual ones being cow peas, velvet beans or sword beans. About six weeks prior to transplanting these legumes are ploughed under and the land kept ploughed until the seedlings are ready to be set in the field and taken to the curing barn. While plants are string up by their boxes while sections are supported outside poles.
(v) **Shade**

This feature is commonly employed in the production of wrapper leaf though some filler leaf is at times grown under shade, not without some loss in quality. Posts are set in the ground to a height of six feet and cheesecloth stretched over the wires attached to these posts.

(vi) **Transplanting**

Under shade the plants are set 8 - 12 inches apart and 3 feet in the rows. Where planting in the open the distance is usually 10 inches apart and somewhat less than three feet in the row. (1) In planting a furrow is opened and plants 30 - 35 days old are set in the bottom of the furrow. It is usual for the plants to receive a setback of about a week while in the wilted state or "durmiendo". (5)

(vii) **After Cultivation**

Inter-row cultivation by machinery is done while the plants are still small so as to give them a good start by providing adequate aeration and at the same time to conserve moisture. Weeds are kept to a minimum at this stage so as to obviate the necessity for this operation at a later stage when injury to the leaf is most likely to occur.

Plants are "topped" by pinching off the flower buds as they appear and is followed by suckering which consists in the removal of the axillary shoots or suckers which develop soon after topping.

(viii) **Harvesting**

Where grown for filler the plants are either cut close to the ground or the stem is cut off in sections, a pair of leaves to a section. Where tobacco is grown for wrapper individual leaves are picked as they ripen, necessitating from three to four cuttings.

Individual leaves are either gathered carefully in baskets or strung on twine in the field and taken to the curing barn. Whole plants are strung up by their bases while sections are supported astride poles.
It sometimes occurs that a reataon crop is taken after cut plants have been allowed to grow.

(ix) Curing

Barns are generally 30 feet wide, 30 feet high, of variable length, of all wood construction and covered with corrugated iron. The method of curing is by Air curing.

The leaves or plants are suspended in tiers and the time for curing varies according to the condition and type of leaf. Normally, the shade grown wrapper cures in less than four weeks while filler leaves require a longer time, may be 35 - 40 days.

(x) Fermenting

After the tobacco has been cured the leaves are usually placed in piles and left for 40 - 48 hours during which time the temperature will have risen to 120 - 130° F. This temperature is ascertained by the experienced man who pushes his hand into the centre of the pile. The more rapid the fermentation the darker the leaf, while slow fermentation produces a brighter leaf. (1)

(xi) Sorting and Baling

The leaves after fermentation are sorted and graded carefully according to size, texture, colour and perfection. Wrapper leaves are baled according to the number of leaves and not by weight, a bale of first-class wrapper containing about 9,600 leaves, i.e. about 160 leaves to 1 lb.

Filler leaves are made up into hands which are in turn made up in "carrotees" there being 4 hands to a "carrote" and 48 - 72 "barrotees" to a bale. The bale is then lightly pressed and wrapped with palm leaf on the inside and burlap outside. (1, 6)

(xii) Manufacture, Production and Trade

Tobacco is the second most important crop in Cuba and production within the past fifty years has varied widely from 35,000,000 lbs. to 90,000,000 lbs. depending upon the market. It is estimated that in the region of 2,000,000 lbs. shade grown leaf for wrapper is grown, three quarters of this being grown in the Partido section, the remainder in Vuelta Abajo.
There are numerous factories in the island most of which are concerned with the manufacture of the world famed Havana cigars. The highly prized aroma of the leaf makes Havana tobacco especially desirable for blending with other leaf in the manufacture of cigars, this being the principal use to which Cuban leaf is put in the U.S.A. (18) Of the average production figure which stands around 85,000,000 for the past few years approximately 55 - 60% has been exported, about 28,000,000 in the form of leaf and nearly 1,000,000 lbs. in the form of cigars. The export figure for 1950, $30,575,143 represents about 10% of the island's total exports. The United States is the principal market and the value of exports to that country in 1950 amounted to some 83% of the total tobacco exports. The following table shows the production and value of exports for the years 1940 - 1950:

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Value of Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>45,138</td>
<td>14,094,000</td>
</tr>
<tr>
<td>1941</td>
<td>56,219</td>
<td>12,139,000</td>
</tr>
<tr>
<td>1942</td>
<td>42,534</td>
<td>14,117,000</td>
</tr>
<tr>
<td>1943</td>
<td>51,400</td>
<td>15,769,000</td>
</tr>
<tr>
<td>1944</td>
<td>41,641</td>
<td>28,051,000</td>
</tr>
<tr>
<td>1945</td>
<td>62,390</td>
<td>50,443,025</td>
</tr>
<tr>
<td>1946</td>
<td>83,489</td>
<td>55,881,135</td>
</tr>
<tr>
<td>1947</td>
<td>77,107</td>
<td>34,688,950</td>
</tr>
<tr>
<td>1948</td>
<td>55,599</td>
<td>32,669,314</td>
</tr>
<tr>
<td>1949</td>
<td>52,558</td>
<td>29,785,015</td>
</tr>
<tr>
<td>1950</td>
<td>92,323</td>
<td>30,575,143</td>
</tr>
</tbody>
</table>

Although produced on a fairly extensive scale in the past, further cultivation has been abandoned, apparently because of competition of other wrapper types. (30)

Cultural Systems
I. HISTORICAL BACKGROUND

It is stated that cultivation of tobacco in this island was legally permitted in the year 1614, but has no doubt been growing long before this date. In the early stages the industry was allied to that of Cuba where an assured market existed for unmanufactured tobacco. With the advent of the Spanish American war and subsequent American occupation in 1898 an open market was provided in the States and the industry expanded considerably to become the second most important of the island. (6, 19)

II. TOBACCO TYPES

Based on topographic and climatic factors the types of tobacco produced fall into three general classifications: (6)

(i) Filler or Interior Type

It would appear that the larger proportion of the island's total production is represented by this type which is grown mainly on the hillsides and in the valleys of the interior. It is utilized both in the manufacture of cigars and cigarettes.

(ii) Coastal

This seems to be a heavy-bodied type which is grown on the Northwestern and Southwestern coastal plains. Besides being of mixed origin the quality of the leaf is apparently adversely affected by the salt air and the leaf is only used for the manufacture of roll chewing tobacco.

(iii) Semi-coastal

This type which appears to be intermediate between the two former and is utilized in the manufacture of inferior cigars is grown in the valleys adjacent to the coast.

Shade Grown Wrapper

Although produced on a fairly extensive scale in the past, further cultivation has been abandoned, apparently because of competition of other wrapper types. (20)
III. CULTURAL SYSTEMS

(i) Soils

It would appear that best yields of tobacco are obtained where grown on friable, well drained and aerated soils which are neutral or alkaline in reaction and situated well beyond the range where affected by salt sea spray. It is said that acidity limits the supply of calcium and magnesium as well as the availability of phosphorus, while favouring excessive solubility of aluminium and manganese. The soils best meeting these requirements seem to be those derived from the weathering of tufaceous, granitic and limestone parent materials. (4, 6)

(ii) Seed-bed

The site is generally located on well drained soils preferably rich in organic matter. Cultivations are begun some months prior to sowing and while vegetative material is ploughed under in some places (2) this is not generally done. (6) Protection is usually afforded seedlings by erecting a framework covered with cheese-cloth (4) and drains are laid between beds to facilitate irrigation and watering while allowing labourers to go through. (2) Seed-beds are not usually sterilised however, (6) but are generally well fertilised. (4)

(iii) Sowing and Planting

Seed may be mixed with ash or sand and is then lightly broadcast over the beds after which they are pressed in with a board or flat hoe and watered. To minimise the incidence of damping off watering is carefully done and the shade gradually reduced to enable the seedlings to harden off before being transplanted.

(iv) Field Preparation

The field is generally ploughed or cultivated about three times before being planted, these operations being usually done by hand. A fertiliser mixture depending upon soil requirements is measured generally applied at the rate of about 400 lbs. per acre. (4)
Transplanting

Seedlings are generally planted out when around two months old, the planting season varying from October to December. Plants are set from 12 - 15 inches apart in rows spaced from 36 - 44 inches apart.

After Cultivation

Plants are mounded up after they have become established and two or three weedings may be given. To facilitate the circulation of air the lower leaves are usually removed about 35 days after transplanting and all interrow cultivation carefully done to avoid damage to the plant. Topping is done as soon as the flower bud appears and the plant pruned so as to leave from 12 - 16 well developed leaves, suckers subsequently appearing being pinched off close to the axil.

Harvesting

This operation begins on an average, 90 days after transplanting, two methods being generally employed. One method is to hand pick the ripe leaves at three different periods, beginning with the bottom leaves, then the middle or best quality and finally the top leaves. In the other case the entire plant is cut when the leaves are of a yellow green colour. The cut plants are allowed to wilt in the field before being taken to the curing barn.

Pests and Diseases

Tobacco in Puerto Rico is subject to the ravages of disease and insect pests, some of which assume great economic importance and are partly responsible for the decline of the industry. Those mentioned here are the more important ones and are commonly found in most tobacco growing countries.

The principal disease affecting the seed-bed is damping-off which is controlled by spraying with bordeaux mixture. Tobacco Mosaic, Black Shank, Leaf Spot and Bacterial Wilt are common amongst older plants. Mosaic and Black Shank are controlled by eradicatory measures as well as by the use of resistant varieties. Bacterial wilt is also controlled.
controlled by the use of resistant varieties but some difficulty has been experienced in the control of Leaf Spot.

The mole cricket is a nuisance particularly in sandy soils and is controlled by the use of paris green baits and by encasing the stems of the young plants with maney leaves. Flea beetles, hornworms and leaf miners are common in tobacco districts and are controlled by dusting the plants with lead arsenate. Flea beetles in particular are controlled by immersing the top of the young plants in a lead arsenate solution before transplanting in the field. (4) Tobacco weevil causes considerable damage to cured tobacco, cigars and cigarettes and is only kept under control by rigid disinfection. (6)

(ix) Curing

Barns may be constructed of wooden frames covered with palm leaves and roofs of dried grass. The better type of barn is an all wood construction, the roof being covered with the leaf sheaths of the Royal Palm over which is placed a cover of galvanized iron sheets. The usual size of the barn is in the region of 80' x 36' x 16'. The leaves or stalks of the tobacco plant are hung in tiers and ventilation effected by opening or closing of the shutters of the barn. Under normal atmospheric conditions, the curing period lasts about 35 - 40 days. (6) Whenever adverse weather conditions prevail charcoal fires are built in the barns to drive off excessive moisture and prevent fungal infection. The practice of curing the whole plant is said to be advisable where tobacco of an inferior type is grown. (2) When cured in this manner the leaves are later removed from the stalk to be classified and fermented.

(x) Fermentation

The leaf is cleaned and classified before undergoing this process, the time for which depends upon the type of leaf and the use to which it will be put. Temperature is never allowed to exceed 130° F and is maintained by breaking down and rebuilding the piles of leaf until thoroughly fermented and of a uniform colour. The fermented tobacco is then cased (sprinkled with a fine spray of water) to facilitate handling. (2)
(xi) Grading

After they have been cased the leaves are sorted and graded according to colour and uniformity. The leaves are then arranged according to size and tied in hands of about 40 leaves after which they are passed through drying chambers and made into carrotes and baled.

(xii) Production, Manufacture and Trade

Tobacco is the second most important crop in Puerto Rico and production has varied from 5 million pounds (5,000,000 lbs.) during the latter part of the Spanish regime to a peak of 50 million (50,000,000 lbs.) in 1927. A disastrous fall in 1932 forced Government to intervene and aid in the stabilization of the industry with the result that production has gradually recovered to an average of 30 million (30,000,000 lbs.) per year. (16)

It would appear that the decrease in production within the past few years is due in part to faulty agronomic practices and the limitation of the quota assigned to the island. It is claimed that the quality of tobacco produced is of the best and it has been recommended that efforts should be concentrated upon the improvement of cultural standards through the education of the small farmer.

Another aspect which seems to have been given some consideration is the industrialization of the industry and utilisation of the by-products for the manufacture of insecticides. (20)

Tobacco manufactures take three forms, cigars, cigarettes and roll chewing tobacco. (6) A large proportion of the leaf produced was formerly manufactured into cigars for local consumption but with the establishment of more efficient factories in the U.S. the local manufacturing trade diminished, and the bulk of the leaf is shipped to the States for processing. (20) Recently however a modern factory has been set up and it is hoped to maintain and even increase the output of cigars. (16) The cigarette industry has been on the steady decline as there is practically no demand for locally manufactured cigarettes.
Chewing tobacco is made up into rolls in small factory units entirely for local consumption and is probably similar to the Jackass Rope of Jamaica.

With the decline of the local cigar industry most of the leaf produced is shipped to be manufactured into cigars in the U.S. Practically all exports of cigars, cigarettes and leaf go to the U.S. and in fact tobacco trade is almost wholly confined to the island and the mainland. The average annual value of exports to the U.S. now stands in the region of $8 million dollars.

Leaf tobacco forms the major part of the imports from U.S. and is used in the manufacture of cigars. Practically all cigarettes are imported from the U.S. and are becoming increasingly popular. Some cigars are imported from the U.S. for local consumption.

The adjoining tables give some idea of the production and exports for the past few years. (17)

<table>
<thead>
<tr>
<th>Crop Year</th>
<th>Acreage</th>
<th>Production in lbs.</th>
<th>Yield/Ac. lbs</th>
<th>Average Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1943 - 44</td>
<td>36,362</td>
<td>28,500,000</td>
<td>783.79</td>
<td>38</td>
</tr>
<tr>
<td>1944 - 45</td>
<td>48,000</td>
<td>42,000,000</td>
<td>875.00</td>
<td>25</td>
</tr>
<tr>
<td>1945 - 46</td>
<td>36,000</td>
<td>32,000,000</td>
<td>888.88</td>
<td>36</td>
</tr>
<tr>
<td>1946 - 47</td>
<td>31,334</td>
<td>23,500,000</td>
<td>750.00</td>
<td>25</td>
</tr>
<tr>
<td>1947 - 48</td>
<td>32,000</td>
<td>25,400,000</td>
<td>793.75</td>
<td>28</td>
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<tr>
<td>1949 - 50</td>
<td>36,000</td>
<td>26,000,000</td>
<td>722.22</td>
<td>21</td>
</tr>
</tbody>
</table>

Exports of Tobacco

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Unmanufactured</th>
<th>Manufactured</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1943 - 44</td>
<td>7,310,328</td>
<td>571,009</td>
<td>7,881,337</td>
</tr>
<tr>
<td>1944 - 45</td>
<td>17,306,862</td>
<td>4,988,595</td>
<td>22,295,457</td>
</tr>
<tr>
<td>1945 - 46</td>
<td>17,839,039</td>
<td>3,568,248</td>
<td>21,407,287</td>
</tr>
<tr>
<td>1946 - 47</td>
<td>14,664,977</td>
<td>1,629,094</td>
<td>16,294,071</td>
</tr>
<tr>
<td>1947 - 48</td>
<td>8,739,503</td>
<td>164,015</td>
<td>8,903,518</td>
</tr>
<tr>
<td>1949 - 50</td>
<td>13,495,193</td>
<td>58,358</td>
<td>13,553,551</td>
</tr>
</tbody>
</table>
I. THE JAMAICA TOBACCO INDUSTRY

Tobacco is probably the oldest industry in Jamaica, dating from the time of the Arawak Indians. It had, however, been only a minor crop for many years until 1936 when a scheme was instituted by the Government for extension of the tobacco industry, through the production of cigar tobacco for export to the U.K. market. A tobacco expert was appointed to organise the industry, and supervise the preparation and marketing of the leaf.

It was only in 1943 that the income from tobacco exports (virtually all cigars) reached the six figure mark. Since the war, however, with the closing of the dollar market to Britain, Jamaica has been relied upon to supply the bulk of the U.K. imports. There is however a limited consumption of cigars in England.

Jamaica tobacco industry now employs a large number of workers growing tobacco and manufacturing cigars principally, cigarette tobacco on a small scale and a cheap twist tobacco, peasant produced, for local pipe smoking. Cigar wrapper type tobacco is not grown but principally imported from Havana.

1947 was a peak year. However, the present U.K. import duty restricts the expansion of the cigar industry, although export of leaf for manufacture in the U.K. is rather at a standstill and areas of cultivation have been severely decreased and workers thrown out of work.

A large amount of cigars were allowed to be imported into U.K. from Cuba, virtually to bolster the sugar industry of the B.W.I. and not import sugar from Cuba who actually could swamp the world's markets.

Export of Cigars in 1938, 1943 & 1950

<table>
<thead>
<tr>
<th>Year</th>
<th>Lb.</th>
<th>£ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1938</td>
<td>32,272</td>
<td>17,028</td>
</tr>
<tr>
<td>1943</td>
<td>156,762</td>
<td>120,673</td>
</tr>
<tr>
<td>*1950</td>
<td>240,328</td>
<td>563,794</td>
</tr>
</tbody>
</table>

* Does not include unmanufactured leaf export at 396,635 lbs. valued at £81,415.
The export tobacco industry is sponsored principally by manufacturing interests, who assist growers in advancing money, selling of seedlings (5 - 10/0 per 1000), advise them on pruning and harvesting and curing. These interests therefore sell to the grower the variety which they want to buy. They buy back the leaf from the grower as cured leaf. The growers are generally peasant farmers growing from 4 - 20 acres tobacco.

There are about 5 - 6 large companies, mainly private except one, the Tobacco Leaf Development Company which is associated with Imperial Tobacco. The latter company is growing about 500 acres for cigars and about 50 acres cigarette (1954). The other principal companies have about 750 acres between them. There are also minor organisations of a similar nature.

The Tobacco Leaf Development sells its tobacco to Machado, a BAT organisation, which makes cigarettes and cigars. There is one other company, Zani, which manufactures cigarette tobacco, principally for people to make up their own cigarettes. Zani also grows a certain amount of cigarette tobacco himself.

These companies have therefore developed a highly efficient peasant system of cultivation, primarily to save money. The peasant is more or less assured of sale and the organisation of growing is fairly efficient.

II. CULTURAL SYSTEMS

The systems of cultivation employed are in general similar to those described in the other islands with slight modifications as set out below:

(1) Seed-bed

After thorough cultivation of the site, seedbeds are made up and bed covers constructed. These may consist of a framework of posts roofed over with thatch or of bamboo hoops covered with cheesecloth. The beds in some cases may be fertilised with a mixture of sulphate of potash superphosphate and a few days before sowing.
(i) **Sowing**

To discourage ants from destroying or removing seed, a mixture of halodane and water is sprinkled onto the beds after sowing.

(a) **Subsequent Treatment**

After germination seedlings may be sprayed with Bordeaux mixture, Cheshunt Compound or Perenox and the shade is gradually reduced to allow seedlings to "harden off".

(b) **Field**

After furrows are opened and fertilizer incorporated, ridges are then made on which the plants are put out, generally at a spacing of 3 x 2 feet or 4 x 1½ feet, the object being to have an average of 7,500 plants / acre. Plants are round cultivated and ridged up and wherever deficiency occurs additional nitrogen is applied as a top dressing.

Priming is not practised, unwanted leaves being left to wither and fall off. It would appear that the system of topping varies from that usually met with in other tobacco areas. Here "Early topping" is done when the inflorescences have just appeared, the terminal portion being pinched off at a level where two even sized leaves are opposite each other. This method is done with Gold Dollar, Delcrest, Harrison Special, Bonanza and Kentucky One Sucker varieties, the other "Late topping" as applied to "Dixie Bright" being done at a later stage when the flowers have already opened.

(iii) **Curing**

Where to be utilised for cigarette manufacture, the leaf is Flue-cured but cigar leaf which forms the majority is all Air-cured.

(iv) **Fermentation**

The dried leaves when still supple are graded and made into heads of 45-50 leaves and made up into piles of 5 x 5 feet to 9 x 9 feet and 5 feet high. The piles are allowed to heat up to 130° F after which they are inverted. Leaf stored in this manner may be allowed to age for from 6 months to over a year.
The establishment of the tobacco industry can be attributed to the Spaniards who colonised these islands early in the sixteenth century. First record of tobacco being grown in Trinidad and Tobago is made in 1653 when the writer John Poyntz stated that the quality of tobacco grown in Tobago was in no way inferior to that of Trinidad, then considered one of the best. (10)

In the earlier part of the seventeenth century, an appreciable trade existed in tobacco, the quality of which was highly praised. The growth of the industry in Barbados and the Leeward Islands however, together with the curtailing of the trade, which was contraband, resulted in a severe decrease in production. (9) From then onward tobacco growing has never been revived to any appreciable commercial proportions. Between 1907 - 1912 cigar tobacco of good quality was produced in the Siparia district, where conditions were considered most suitable for the crop, small areas being also grown in the Maracas valley. (10, 21, 22)

Little interest was taken of the crop until 1923 when its cultivation was begun at the Imperial College of Tropical Agriculture and has continued to be grown partly for demonstration purposes and because it has proved a paying crop. (10, 21) During these years investigations have been, and still are being carried out at the College to determine how best certain aspects of its culture could be improved. At present investigations are being undertaken by the Indian Tobacco Company and I.C.T.A. to determine whether Flue-cured leaf tobacco can be profitably produced in Trinidad. From its inception the industry in Tobago has been mainly a peasant concern and still continues to be, though on a negligible scale. However good quality cigar tobacco has been produced and exported in the past, as much as 50,000 lbs. being absorbed per year in Trinidad during the early 1930's. With the change in smoking habits
From cigar to cigarette tobacco, there was virtually no demand for Tobago tobacco (10), and with the exception of a few small holders, little tobacco is now produced in the island.

II. TYPES OF TOBACCO GROWN

In past years the attention of the peasant has been directed to the production of cigar tobacco or at any rate a heavier air-cured type of leaf. The College has concentrated more upon the production of an air-cured Virginian tobacco; a Flue-barn has since been erected and put into operation with a view to producing a superior type of cigarette leaf, another has also been erected by the West Indian Tobacco Company for a similar purpose.

The leaf grown is generally of Canadian origin and within recent years several new varieties have been imported. These include Bomanza, Delcrest, Yellow Mammoth, and Gold Dollar.

III. CULTURAL METHODS

The standard of cultivation by the peasant in Trinidad and Tobago is undoubtedly poor, and in the absence of any large scale production, systems employed at I.C.T.A. may well be adopted as the basis criterion, with the hope that should the industry be expanded these methods will be closely adhered to.

(i) Soil

It has been claimed (22) that the light sandy soils of the Oropouche and Siparia districts are ideal for tobacco growing, the allusion being probably to the regosols of the district, where physical conditions serve as a medium to which the necessary amounts of good fertiliser may be added. The soils of the College Old and New Farms on which tobacco is grown is River Estate loam (23), one of the chief detrital soils of northern Trinidad. This agonal alluvial soil has been developed over nicaceous and schistose sand alluvium, the profile being strongly to slightly acidic.
The soils of the leeward district in Tobago have been described (24) as being most favourable for the production of tobacco, the areas best suited to the production of light tobacco being probably located on alluvial strips.

(ii) **Seed-beds**

These are generally located near the field to be planted and are made up of rich humic soil which is sieved and steam sterilised. Seed-beds are of varying lengths and raised 6-12 inches from the ground. Generally some form of shelter is erected to protect the seeds and subsequently the seedlings from being damaged by the rain. The shelter may be made of bamboo and topped by palm leaves or a roof consisting of alternate panes of glass and sheets of corrugated iron as has been done at the Imperial College (23). The alternative method is to plant the seeds in boxes of 1 sq. yd. in area on a raised platform and protected from rain and sun.

(iii) **Sowing**

The seed is usually broadcast mixed with ashes or fine earth, a good measure used being 1/24 oz. seed for every square yard of bed. Pricking out of seedlings into another seed-bed at an early age has been found conducive to the production of vigorous seedlings. This method would prove unprofitable however on a large field scale.

(iv) **Field Preparation**

Prior to transplanting the land is thoroughly ploughed, the object being to discourage weed growth. Ridges are then made generally about 9 inches high and 3 feet apart, the idea being that while good drainage is provided in the wet season, the furrows can be utilised for irrigation purposes during the dry spell.

(v) **Transplanting**

This operation is usually done when seedlings are about 6-8 inches high, care being taken to plant early morning or late evening or on damp days to facilitate early establishment.

(vi) **After Cultivation**/
(vi) *After Cultivation*

In order to keep weed growth to a minimum, beds are hoed when necessary and plants mounded up. Whenever needed irrigation water is applied in appropriate quantity. The operation of priming is done by removal of the bottom leaves to a height of some 6 - 9 inches, to provide better aeration and to avoid mechanical injury. Topping is done soon after the emergence of flower buds to leave about 14 - 18 marketable leaves and sucker growth removed until harvest.

(vii) *Harvesting*

About three to four weeks after topping harvesting is commenced, the lower leaves being first picked until the entire stem is stripped. The harvested leaves are then bundled up and taken in baskets to the curing barn.

(viii) *Pests and Diseases*

A. *Pests*

Severe damage is done to leaves by the tobacco horn worm, (larvae of the Hawk moth, *Protoparce sexta*) as well as by larvae of the Pyralidae. Efficient control can be applied by picking them off before the attack becomes severe but on a large scale BHC or DDT dusts should be applied.

Tobacco Flea Beetle - *Eritrix parvula* may sometimes be present in the field causing damage to the leaves by riddling them with small holes. BHC or DDT dust is found to effect good control.

B. *Diseases*

1. Black Shank : *Phytophthora parasitica* var. *nicotiana* is common among planted out seedlings, destroying stems at ground level. This disease has proved very difficult to control.

2. Frog Eye Spot : *Cercospora nicotiana* is common generally occurring on the lower leaves and under wet conditions. Priming tends to reduce its incidence.

3. Tobacco Mosaic
3. **Tobacco Mosaic**: This disease appears to be fairly common and is probably caused by cucumber mosaic virus spread by *Aphis gemmipara*.

4. **Frenching**: This disease is a physiological one producing symptoms similar to a virus and is of unknown origin but appears to be more serious under wet conditions.

5. **Damping off**: This disease is commonest among seedlings and is best controlled by careful watering, avoidance of overcrowding or watering with chechunt compound.

**(ix) Curing and Fermentation**

Tobacco has been air-cured in the past but this method has proved unsatisfactory. Leaves were hung back to back in pairs on sticks stacked in tiers in a room, temperature being controlled as best as possible, the process lasting some 4 - 6 weeks.

Flue barns heated by oil burners have been erected at the College and by the West Indian Tobacco Company at Verdant Vale, Couva, and have been in operation during the present season. While results have not been spectacular they are encouraging and it is hoped that before long this method will prove to be the answer to supplying a better quality leaf to meet the requirements of the manufacturers. It would appear though that this system of curing precludes a regular and adequate supply of leaf for the efficient operation of the Flue barn.

The method employed in fermenting tobacco is to tie about 30 - 40 leaves in a hand and pack in a box of dimensions 15 feet by 3 feet by 6 feet. (25) Reports on leaves cured in this manner were satisfactory in 1952.
Production, Manufacture & Trade

As indicated before there is little or no demand for locally produced tobacco and only negligible quantities are grown by peasants. Despite adverse criticisms on its quality the product obtained from the College is readily sold and shows a handsome profit, while that produced by the peasant is grossly inferior and often worthless mainly because of the faulty agronomic practices.

In 1911 cigar fillers and heavy tobacco was shipped from Tobago to Trinidad where there was a ready sale (24) but smoking habits have since changed and there is no such trade today.

The bulk of the tobacco used in the island at present is imported mainly from the U.S.A. and Canada, imports of unmanufactured leaf during 1952 being some 14,000,000 lbs., 80% of which was obtained from Canada and the remainder from the U.S.A. A very small proportion of Turkish leaf is imported from Turkey and Greece. Of the manufactured imports the greatest proportion comes from the United Kingdom.

A tobacco factory owned and operated by the West Indian Tobacco Co., Ltd., is the only one of its kind in the island, the products of this factory being as follows:

1. ANCHOR: Canadian Flue-cured Virginia and dark air-cured Cavendish.
2. ANCHOR SPECIAL: Canadian Virginia and air-cured Burley and Cavendish.
3. RALEIGH: American Virginia, Burley and Turkish
4. CLIPPER: Selected Virginia
5. BLACK HORSE PIPE AND CHEWING TOBACCO.

Should the popularity of the blended cigarette continue to increase it will have an important effect on the various types of leaf used in its manufacture and the demand for air-cured leaf may be of benefit to the peasant producers and small cultivators who have not the capital to erect flue curing barns. (23)
It is known that attempts were made by the English to cultivate tobacco in this country early in the seventeenth century. (7) Cultivation has been continued since and is claimed to have been for many years, one of the chief pursuits of the people of the North and South savannas of the Rupununi. (28)

The crop is cultivated mainly on small plots and the industry is today practically confined to a few settlers in the north of the Rupununi and to a smaller extent along the banks of the Mahaica and Mahaicony rivers.

Within recent years efforts have been directed towards the extension of cultivation with assistance from C.D. & W. funds, (8) and it is being hoped that Flue-cured Virginia and dark fire-cured tobacco can be produced. (17)

There are two factories operating in the colony and it is expected that their supplies will be greatly supplemented in the future by locally produced leaf.

Production has been greatest in 1950 when 31,161 lbs. of Rupununi Plug tobacco was shipped to Georgetown. During the war years the price of this leaf reached the figure $1.92 per lb, whereas the price in 1951 was at the level of 65¢ per lb. (28)

It is said that among the difficulties facing the area are, lack of a dependable labour supply, difficulty of transport and the lack of an assured market. Should it become possible to surmount these difficulties and the quality of leaf be acceptable, British Guiana may well become an important supplier of leaf to the area.
No information has been available to indicate how long tobacco has been cultivated in British Honduras but it is known that the Maya Indians in the Northern District have been growing it for many years for their own consumption.

The crop is at present grown on a very small scale and while standards of cultivation are for the most part low, in some areas they may be considered fair and isolated cases exist where modern flue-curing barns are in operation. Reports on the quality of leaf produced however have been generally disappointing, and the leaf produced is utilised for blending with imported leaf in the manufacture of cigarettes.

It would appear that "cigar filler" tobacco might be grown on the heavier soils in the more humid areas, while the sandier soils in the pine ridge country might with proper cultural practices prove better suited to the production of "bright" tobaccos. (29)

Investigations are being carried out with a view to determining what type of tobacco can best be grown and whether it is worthwhile cultivating the crop on a commercial scale.

The only tobacco factory in the island is operated by the owner of the estate mentioned above, the products of this factory being cigarettes mainly for local consumption and cigars, most of which are exported. Reports figured (30) for the period 1949 - 52 are set out below and give some idea of the progress of the industry.

<table>
<thead>
<tr>
<th>Tobacco Cigars and Cigarettes</th>
<th>1949</th>
<th>1950</th>
<th>1951</th>
<th>1952</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarettes</td>
<td>338</td>
<td>337</td>
<td>328</td>
<td>328</td>
</tr>
<tr>
<td>Value</td>
<td>$ 7,654.00</td>
<td>$ 8,486.00</td>
<td>$ 10,807.00</td>
<td>$ 11,880.00</td>
</tr>
</tbody>
</table>
It is believed that tobacco cultivation in the Windward Islands was begun around the same time (early 17th Century) as it did in the neighbouring islands. It would appear however that tobacco growing has never attained any prominence in the economy of the islands concerned, the crop being now grown mainly by peasants primarily for local consumption in Dominica and to a smaller extent in St. Vincent.

Cigarettes are manufactured on a small scale in factories which are independently owned in St. Lucia, St. Vincent and Dominica. In these factories, locally grown leaf is utilized to some extent in the manufacture of cigarettes. However, where grown, locally produced leaf is utilized to some extent in the manufacture of cigars which are largely manufactured for export. Where grown, locally produced leaf is utilized to some extent in the manufacture of cigarettes. The quality of the products of these factories is not always up to commercial standards. However, considerable research will have to be undertaken, with special emphasis upon the quality of the products, in order to improve the quality of the products of these factories.

### DOMINICA

The tobacco industry of this island, it is claimed, is a minor one of growing importance (30), the crop being grown mostly on small holdings either between young fruit trees or on shifting cultivation, but there is one estate (Hillsborough estate) on which the crop is grown on a larger scale. (8)

The only tobacco factory in the island is operated by the owner of the estate mentioned above, the products of this factory being cigarettes mainly for local consumption and cigars, most of which are exported. Export figures (30) for the period 1949 - 52 are set out below and give some idea of the progress of the industry:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cigarettes</th>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1949</td>
<td></td>
<td>1801 lbs.</td>
<td>$ 7,724.00</td>
</tr>
<tr>
<td>1950</td>
<td></td>
<td>2250 &quot;</td>
<td>8,416.00</td>
</tr>
<tr>
<td>1951</td>
<td></td>
<td>3120 &quot;</td>
<td>10,847.00</td>
</tr>
<tr>
<td>1952</td>
<td></td>
<td>2345 &quot;</td>
<td>11,860.00</td>
</tr>
</tbody>
</table>
DISCUSSION AND CONCLUSIONS

The economy of the West Indies is based upon agriculture and especially upon the growth of a few export crops. With the increasing pressure of populations upon limited resources it is imperative that systems of agricultural production and distribution be devised with the object of obtaining the most economical returns from available land.

There is an obvious need for the introduction and development of alternative economic crops in the area, and tobacco growing on a commercial scale may well be considered. Although already well established and featuring prominently in the economies of the larger islands of Cuba, Puerto Rico and Jamaica, the crop is grown only on a negligible scale in some parts and in others not at all.

Before embarking upon commercial tobacco growing however, considerable research will have to be undertaken, with special emphasis upon the quality of the product. This can be achieved only by proper selection and good cultural practices. It must be remembered that quality is determined by consumers' demands. Smokers are a conservative lot, and it is unlikely that having grown accustomed to a standard product they will prefer a tobacco with new characteristics. If these obstacles are overcome and an assured market provided, the advantages to be gained will prove of considerable benefit to the area.

As regards local consumption it may be possible for manufacturers to use small quantities of local leaf for blending with imported leaf, gradually increasing the amount until a satisfactory substitution is effected.

The revenue received from tobacco imports into the region is considerable and the curtailing of this revenue by increased local production is likely to be frowned upon by local governments.

Should tobacco growing on a commercial scale prove feasible, a large proportion of the crop will undoubtedly be produced by peasants and/
and small farmers. It will be left therefore to the Agricultural Departments of the region to render close supervision and assistance as regards production and marketing.

It is difficult however at this stage to draw conclusions until actual trials are carried out.
ACFN CWIEDGEMENTS

Acknowledgement is especially due my tutor Mr. J.C. Campbell for his suggestions, advice and guidance in the writing of this project, and to Mr. P. Greening for his interest.

The information kindly supplied by the Departments of Agriculture of Cuba, Puerto Rico, Jamaica and Dominica is also greatly appreciated.
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