

REPORT
ON THE
FORESTRY PROBLEMS
OF
JAMAICA
BY
A. WIMBUSH,

Chief Conservator of Forests, Madras, India.

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INTRODUCTION

At the request of the Colonial Office to make an investigation of the various aspects of Forestry in Jamaica with a view to the formation of a forest policy for that Island, I left England on October 4th, 1935, and arrived at Kingston on October 28th.

2. On arrival I wrote to the Colonial Secretary of Jamaica, requesting Government's orders as to the points on which my advice was required, and in reply, received the Colonial Secretary's letter No. 3821/33, dated November 5th, 1935, in which he stated as follows: -

"It is desired that you should deal with the problems of de-afforestation, the protection of existing forest lands, re-afforestation, the study of windbelts and the protection from trees against the North winds. It would also be useful if you could make any suggestions for encouraging the planting of cedar and mahoe."

I was also instructed to get in touch with the Chairman of the Water Board, inspect the catchment area and make recommendations with regard to its conservation.

3. A motor car having been put at my disposal, and the Acting Surveyor General having given me every possible facility in the matter of help in drawing up tour programmes and the provision of local Officers of the Lands Department to accompany me on my inspections, I proceeded to tour all over the Island, taking every opportunity that offered, as a result, largely, of letters of introduction written by the Acting Surveyor General or Government, to meet local residents who were likely to be interested in forest conservation, and to discuss forestry problems with them.

4. A good deal of literature dealing with Jamaica has been put at my disposal. Amongst it are several reports dealing with forest questions, and also most full and detailed accounts of such scientific matters as the Geology and Rainfall of Jamaica. A perusal of this literature, and a consideration of conversations with those who may have to read this Report, leads to the belief that what is wanted is a simple, comparatively non-technical statement of facts, opinions and advice without much detail relating to the science of forestry and allied sciences, of which latter the local aspects are already well known to most of those for whom this Report is intended.

Consequently, I propose to give only a rough outline of essential facts in Part I of my Report, which I shall entitle "*Description of Jamaica and Past History*," and more detailed expressions of facts, opinions and advice in Parts II and III – "The Present" and "The Future."

5. Before closing this introduction, I wish to take the opportunity of expressing my thanks to His Excellency Sir Edward Denham, Governor of Jamaica, and all those others, both Officials and non-Officials, who have done everything in their power to help me with my investigation, and to make my tour in Jamaica enjoyable and instructive.

PART I.

DESCRIPTION OF JAMAICA AND PAST HISTORY.

6. *Situation and Description.* - Jamaica, an Island in the Caribbean Sea, is situated between $17^{\circ} 43'$ and $18^{\circ} 32'$ N. lat. And $76^{\circ} 11'$ and $78^{\circ} 2' 50'$ W. long and is about 4,120 miles to the south-west of England, in the West Indies.

The Island is 144 miles long and its width varies between 49 miles and $21\frac{1}{2}$ miles. Its area is 4,450 $\frac{1}{4}$ square miles, or 2,848,160 acres.

The Island is extremely hilly. Its highest point on the Blue Mountains has an elevation of 7,360 feet and every altitude and degree of slope is found between this and the plains, which latter comprise less than 15% of the total area of the Island and are composed chiefly of alluvium, marl and swamps.

7. *Geology.* - The foundation or basis of the Island is composed of igneous rocks, overlying which are several distinct formations. An excellent and detailed Geological Map of Jamaica accompanies the Reports on the Geology of Jamaica by James G. Sawkins, F.G.S. and for the purposes of this Report, it will suffice to say that the highest hills and steepest slopes, namely, those on the Blue Mountains towards the eastern end of the Island, are composed chiefly of Shales which are very liable to erosion, whilst the greater part of the rest of the Island consists of white limestone which suffers very little from erosion. Near the centre of the Island on the Black Ground in Trelawny Parish and stretching across Manchester Parish to Bull Head Mountain in the Parish of Clarendon is a considerable area in the Trappean Series and near the mouths of most of the very numerous rivers of Jamaica, pockets of Alluvium of varying size have been deposited.

8. *Climate and Rainfall.* - A considerable variety of climates is met with in Jamaica; to quote the Handbook - from a tropical temperature of 80° to 86° at the sea coast the Thermometer falls to 45° and 50° on the tops of the highest mountains. Much more striking, however, is the variation in rainfall. Very full details may be obtained from a Government Publication entitled "The Rainfall of Jamaica" from about 1870 to 1929. Suffice it to say that the wettest part of the Island, where well over 100" of rain fall in a year, is on the tops of the Blue Mountains and on their northern slopes in Portland Parish, whereas the driest part comprises Kingston, Port Royal, The Healthshire Hills and Portland Hills in the centre of the south coast, and also a strip on both sides of Falmouth on the north coast. In these localities the rainfall is less than 40 inches in the course of a year, whilst the annual average for the whole Island of Jamaica is about 67 inches.

HISTORY AS IT AFFECTS THE FOREST QUESTION.

9. Jamaica was discovered by Christopher Columbus in 1494. In 1509 the Spaniards, under Diego Columbus, Viceroy of the Indies, took over the Island and proceeded to wipe out most of the local Arawak inhabitants. In 1636 the English invaded the Island, and by 1655 they had conquered it finally and turned out the Spaniards.

10. In Charles II's reign, a start was made to apportion out the land to private individuals who cultivated sugar cane on a large scale through the labour of negro slaves imported from Africa under the auspices of the Royal African Company.

11. In the second half of the seventeenth century, the lowlands of Jamaica were alienated from the Crown, and in the following century, the necessity having arisen for the production of ground provisions or foodstuffs to feed the largely increased negro population, the higher lands were also applied for and apportioned out to private planters. This later distribution of lands continued until most of the soil of the Island, with the exception of the Cockpit Country of Trelawny and St. James, passed out of the control of Government, even the summits of the Blue Mountains being given out to various individuals in 1781.

12. The Coffee plant had been introduced to Jamaica from St. Domingo in 1728 by Sir Nicholas Lawes and its cultivation proceeded apace, especially on the slopes of the Blue Mountains.

13. It was shortly prior to the abolition of slavery in the thirties of last century that the production of coffee and sugar in Jamaica reached its maximum; as the production of coffee and sugar declined, the export of pimento and ginger increased.

14. The growing of bananas on a very large scale did not start until a much later date. The first "Gros Michel" Banana was planted in Jamaica just 100 years ago, and it is 50 years since the export of bananas, which is now the biggest industry in Jamaica, was started on a very small scale by a Company formed by Mr. Andrew Preston.

15. Fruit trees of many different species, chiefly exotics, have been grown in Jamaica for very many years. The most important of these are those clubbed together under the collective term "Citrus," of which the grapefruit and orange are exported in large quantities.

16. During the 400 years under consideration there was, naturally, a very great increase in the population of Jamaica, with the result that demand for land increased also. During the course of years many of the larger Estates have been split up, wholly or partially, by sale of small lots to labourers on the Estate or their descendants. Again, the demand for land for the growing of foodstuffs has been met to a great extent by the system of renting small areas to tenants. These tenants have, for years past, practised shifting cultivation, a most pernicious system under which an area of woodland is cut down and burnt in order that the land may be made to produce a crop of foodstuffs with the minimum of labour. As each area is exhausted which takes place in 2 or 3 years, a fresh piece of woodland is cut down and bunt, and so on until a whole countryside has been denuded of its original forest growth.

17. The obvious and inevitable result of this destruction of the forest, which was very frequently followed by fires, often lighted intentionally, in the grass and regrowth which sprang up after an area was abandoned, was that erosion of the soil took place, landslips occurred and rain-water instead of soaking gradually into the soil to feed the streams and springs slowly throughout the year, rushed off the steep hillsides, causing floods and consequent damage to roads, bridges and agricultural land.

18. From time to time the Government of the day became perturbed by the manifest damage which was being done to the country. Fifty years ago, in 1885, the services of Mr. E.D. M. Hooper of the Indian Forest Service were obtained for the purpose of making an enquiry on the spot, and advising on the question of the maintenance of the forests in Jamaica.

Mr. Hooper wrote a detailed report, and a very brief summary of his proposals is as follows:-

- 1st. Reserve the Highlands of the Blue Mountains, arranging to escheat, acquire or obtain amicable surrender of private lands where necessary.
- 2nd. Demarcate and survey the Reserve so formed and protect it against fire, theft and trespass.
- 3rd. Retain as forest reserves all blocks of Crown Lands on the limestone formations that exceed 2,000 acres in extent. Restrict cultivation of ground provisions in them wherever possible or expedient. Protect the Reserves against the felling of valuable timbers and generally conserve them.
- 4th. Enforce rigidly all conditions in the Cinchona leases, etc.

Mr. Hooper proceeded to show how effect could be given to the general policy which he advocated.

19. Shortly after Mr. Hooper's visit to Jamaica, "The Mountain and River Reserves Law" – Law 37 of 1889 was passed, then "The Amending Law 22 of 1892" was passed.

20. Next we read of "Practical Difficulties" raised by the Surveyor General in connection with these two Laws, with the result that after a Committee had recommended their repeal, both these Laws were repealed by Law 14 of 1893. The findings of this Committee and the results are significant; the Committee reported that the timber was of no commercial value, owing to cost of transport and that landowners could be relied on, in their own interest, to prevent undue denudation of ridges which were, as a rule, unsuitable for cultivation and reserved as woodland for estate use. River reserves would supplant useful cultivations and the demarcation of reserves would be very difficult and costly.

21. In order to assist the policy of afforestation by landowners in their own interests, the Director of Public Gardens was instructed to supply landowners, free of charge, with trees for replanting bare mountain slopes within the amounts provided for this purpose, annually.

22. The last part of what is written above is extracted from a "Report on Afforestation in Jamaica by the Committee appointed by the Acting Governor in 1926." This Report is most enlightening and great difficulty is experienced in refraining from quoting from *it "in extenso."* It is realised, however, that the object of the present Report would be defeated if its length and prolixity had the effect amongst its readers of producing satiety long before they reached the end. Whilst, therefore, commending a perusal of the Report referred to above to all, I propose to endeavour to confine myself as far as possible to a bare statement of essential facts contained in it.

23. In 1911, Government bought back for 5/- per acre, 116 square miles of Crown Lands which had been alienated as a part of the price for the extension of the Railway in 1889. All or some of this was forest land which Mr. Hooper (I.F.S.), 25 years before, had advised should be reserved "at all hazards." The Secretary of State approved of the purchase of these lands, but suggested that a detailed Scheme as to the areas to be conserved and those to be opened up should be prepared, and that this should be provided for in a special Law. The Colonial Government and its advisers, however, thought a Law was not necessary.

24. An attempt at forest legislation was made in 1913, when Mr. Cousins introduced "The Mountain Reserve Law, 1913," in the Legislative Council. This Bill passed two readings and was then withdrawn by order of the Governor, before its third reading. This withdrawal was due to the fact that steps to ascertain the probable cost of giving effect to the provisions of the Bill had been omitted.

25. In March, 1924, an Agricultural Conference was held in Jamaica, and in November of that year the Board of Management of the Jamaica Agricultural Society appointed a Committee to report on the general question of afforestation and the maintenance of soil fertility. This committee recommended the appointment of another Committee, which was duly appointed, and which met and issued a Report. This Committee recommended that Government should be requested to legislate on the basis of Mr. Hooper's advice given forty years previously. Amongst other proposals, it recommended that the staff of the Surveyor General's Department should be strengthened so that supervision could be provided for the effective carrying out of the proposed Conservation of Forest Law.

26. I can find no orders on these proposals, but what is apparent, is that shortly after this Committee had written its Report, yet one more Committee was appointed, in 1926, this time by the Acting Governor.

The Report of this Committee of 1926, already referred to above, from which so much of my information has been gleaned, contained various recommendations. Amongst other things, the Committee recommended that an Afforestation Law should be submitted to the Legislative Council to provide-

- (a) for acquisition of lands for reservation as forests,
- (b) for the creation of a Forestry Board to advise the Governor on forest matters, with the Surveyor General as Chairman,
- (c) for the appointment of an Afforestation Committee in each parish,
- (d) for empowering Parochial Afforestation Committees to enforce the planting with suitable trees of the immediate banks of any rivers and streams, and the maintenance of such protective plantations as may be required to reduce damage to alluvial lands from being washed by floods,
- (e) for enabling Parochial Afforestation Committees to certify that any proprietor has established to their satisfaction, a "Forest Reserve" on his property, so as to entitle the said proprietor to claim a statutory reduction in the Property Tax payable by him, not exceeding 10% of the gross Property Tax leviable on the said property.

The Committee made other proposals, including the strengthening of the staff of the Surveyor General's Office by the addition of an officer competent to supervise Forest Reserves on Crown Lands, the provision of funds for demarcating Forest Reserves and for providing economic trees and plants to

the public from nurseries, the stricter enforcement of the "Country Fires Law," instructions to the Law Officers of the Crown to draft measures for simplifying the proceedings for enforcing protection against trespassers on Forest Reserves and the provision by Law of exceptional powers to safeguard such public property; also, the introduction of legislation prohibiting the sale or use of the bark of mahoe and mahogany trees.

The Committee did not consider that the Colony would gain any practical benefit at that time from the visit of special Forestry Officer, and was convinced that the conditions in Jamaica did not justify the cost of a special Department of Forestry.

27. The Report of this Committee of 1926, appears to have borne some fruit for in 1927 "Law to regulate Afforestation"- No. 33 of 1927- received the assent of the Governor, and in 1929, an Inspector of Plant Diseases was transferred from the Agricultural Department to the Surveyor General's Office with the title of Assistant Conservator of Forests. This Officer proceeded with the small amount of funds put at his disposal, to make some inspection paths, and to lay out some nursery beds in various localities for raising tree seedlings for free distribution to the public. He started a plantation near Mount Airy of *Pinus Massoniana* with seedlings raised from seed obtained from Hong Kong. His other activities included frequent inspections of the Crown Lands, especially those on the Blue Mountains and constant efforts to limit the introduction of tenant cultivators into forest areas, and to turn out those found cultivating illicitly.

28. As regards the immediate past, the following Resolution was passed unanimously at the Annual General Meeting of the Council of the Jamaica Imperial Association on 25th April, 1934:-

"Resolved that the Jamaica Imperial Association's Annual General Meeting assembled respectfully requests the Government that, in view of the importance of a better system of afforestation being undertaken in Jamaica, consequent on the constant denudation of our hillsides which is taking place, with the result that the surface soil is constantly being washed away by heavy rains, it should approach the Colonial Office with the request that the Colonial Development Committee should send an Expert Forestry Officer to this country to study and report on the steps to be taken by the local Government for this desired improvement, the expenses of such an officer to be borne by the Colonial Development Fund."

The Colonial Office in London was addressed by the Government of Jamaica with regard to the possibility of obtaining the services of an experienced Forester to make an investigation in Jamaica.

The Memorandum drawn up by the West Indian Branch of the Colonial Office, in supporting the proposal and asking that money might be provided from the Colonial Development Fund, indicated the possibility of its being advisable for the Governments of the Windward Islands and of the Leeward Islands to avail themselves of the chance of having their forests inspected by the same officer whilst he was in the West Indies and eventually it was decided that the officer should make a tour of those Colonies as well as of Jamaica.

The Memorandum then went on to discuss the probable cost of a combined investigation and in arriving at a figure of expenses allowance was made for a stay to two months in Jamaica.

In due course the present writer was chosen to carry out the investigation in all three Colonies and a tour programme was drawn up for him. This programme allowed for a stay of two months in Jamaica and it proved that this period was sufficient to allow of a very full investigation being made, as a result of which this Report has been written.

PART II.

THE PRESENT.

29. The present state of affairs as regards forestry in Jamaica is far from satisfactory, a fact which has been impressed upon the writer by practically all the influential gentlemen, both officials and non-officials, whom he has had the benefit of meeting. Tours through every parish in the Island, involving inspections both of Crown Lands and private lands, have enabled the writer to form a somewhat detailed personal opinion as to the state of affairs, and the reason for it.

30. It is desirable to deal with the position in the Government Crown Lands first, and afterwards, to say something about the private lands.

THE CROWN LANDS.

The total area of Crown Lands is 270,231 acres.

31. It has been mentioned in Part I of this Report that most of the land in Jamaica was apportioned to private individuals, after the British occupation. The Cockpit Country, mostly in the parishes of Trelawny and St. James, which, owing to its inaccessibility and obvious unsuitability for cultivation, was not so apportioned, has always remained Crown Land, but the bulk of the other Crown Lands has reverted to Government gradually, owing to forfeiture for failure of the owners to pay quit rent or taxes. At the present time, Government has on its hands, as Crown Land, some 900 separate properties, the vast majority of which are less than 5 acres in extent, which have been forfeited as described above. These small areas are available for sale, and are not included in the main blocks which are looked upon as available for reservation as Government forest if required.

32. The Crown Lands are under the Surveyor General. The practice has been to lease out to any petty cultivators who might apply, areas of Crown Land for cultivation. These leases are given out and controlled by men termed Bailiffs, who receive 10% of the rent which they collect from the lessees as remuneration to supplement a very small salary.

33. The usual method of cultivation practised by the tenants, consists of burning a patch of forest and clearing the growth, and then taking one or more crops of foodstuffs off the area. A number of tenants also grown bananas. It very frequently happens that a man who is paying rent for, say, one acre burns and destroys forest on a very much larger area. So far as the writer has been able to ascertain, a tenant who does this does not suffer at all from a guilty conscience, nor is it usual for him to suffer any penalty. One such man explained to the writer, when standing in a devastated area of about 12 acres inside the evergreen forest hill, but that he had, naturally, been obliged to burn and open up the forest all round in order to obtain light for his holding. It was further stated that the Bailiff had never visited the area.

34. Now the Assistant Conservator of Forests has done his utmost to get a limit put to this leasing out of afforested Crown Lands to tenants, and in an official Report has brought to light instances of abuse, with the result that the present Acting Surveyor General, on taking charge recently, has prohibited all future leasing of Crown Lands, pending this present Forest Enquiry, except such as are certified by the Assistant Conservator of Forests, to be devoid of forest growth already.

35. The Assistant Conservator of Forests has under him six men called Forest Rangers. They are quite untrained, and are not Forest Rangers in the accepted meaning of the term, any more than the Head Forest Officer of Jamaica is an Assistant Conservator of Forests. These Forest Rangers receive a salary of £2. 10s. 0d. a quarter, or £10 a year, and three of the six men are Bailiffs as well as Forest Rangers. As explained above, Bailiffs are expected to supplement their very low salary by collecting rents from tenants and receiving 10% of such collection for themselves. We, therefore, have the impossible position in which a Forest Ranger is dependent for a great part of his livelihood upon putting as many tenants as possible on to the land in his capacity as Bailiff, in order that he may obtain 10% of the rent for himself, whilst realizing that the shifting cultivation which the tenants will practice must ruin the forests.

36. The above facts show that inadequately controlled shifting cultivation has been allowed and encouraged by Government on Crown Lands, and since these are the only areas which carry any Government Forest, we have arrived at one of the main reasons for the unsatisfactory state of affairs as regards forestry in Jamaica.

37. There are other reasons also. The Jamaica Government Railway utilizes on the average 45,000 sleepers per annum. For some years past the whole of this supply has consisted of untreated Jamaica hardwoods. The Railway employs sixty-one different Sleeper Contractors. The trees for felling are not selected or marked by Government Officials, and there is no division of the forest into

Coupes or annual felling areas, and there is no restriction as regards girth limit of trees to be felled. From the forestry point of view there is, therefore, no restriction of any sort put upon the activities of these Sleeper Contractors.

The removal of timber other than Sleepers, is also permitted from Crown Lands on payment of royalty. The control of such removals is, ultimately, in the hands of Bailiffs, who have been mentioned above.

38. From the above facts, it might be expected that there would be very little timber left in Jamaica. No doubt this would be the case were it not for certain provisions of Nature. The Cockpit Country, where the most important timber forests are, is inhospitable to a degree, perhaps, unequalled by any locality of such small area in the world. Its configuration is not dissimilar to that of an honeycomb. The sides of some of the "sink holes," as they are called, are practically perpendicular, but the general surface of the ground is covered with large limestone boulders, which make movement very difficult. No water is available, as the copious rainfall passes straight through the limestone formation to feed underground rivers which emerge some miles away outside the Cockpit Country. As a further safeguard against the intrusion of man, Nature has stocked the forests of Jamaica with the most voracious daylight mosquitoes which make a smoke screen necessary when halting for a meal. In certain areas, notably on the euphemistically named "Healthshire Hills" there is, in addition to the mosquitoes, some poisonous form of growth which when rubbed against unwittingly, causes intense irritation and inflammation for about a fortnight.

39. The net results of all the above facts is that whilst easily accessible areas have been heavily over-exploited, every saleable tree being cut long before it is mature, a limited area, especially in the interior of the Cockpit Country, still contains valuable tropical forest with large trees of useful species.

40. No less than eleven different species of hardwood are accepted by the Railway in the form of untreated sleepers-a number far in excess of that found fit for sleeper work in some other tropical countries many times larger than Jamaica. The sleeper species are as follows:-

Red Bullet Tree	(Dipholis nigra)
Fiddlewood	(Petitia domingensis)
Braziletto	(Peltophorum brasiliense)
Rosewood	(Fagara rhodoxylon)
Naseberry Bullet Tree	(Mimusops sideroxylon)
Green Heart	(Sloanea jamaicensis)
Dogwood	(Piscidia erythrina)
Sapadillo	(Mimusops excisa)
Red Iron Wood	
Mountain Guava	(Piseidia erythrina)
Blue Mahoe	(Hibiscus elatus)

The botanical names are taken from "The Timbers of Jamaica" by W. Harris, F.L.S.

41. In that part of the Cockpit Country traversed by the writer, the lower age classes were well represented, there was no excessive damage from climbers and the stocking was satisfactory where no tenants had been at work.

42. It should be mentioned here that Government have recently been allotting small plots in some of the Crown Land forest areas to ex-soldiers for cultivation. Some of the areas so allotted are in the sort of inaccessible evergreen forest described above, and are eminently unsuitable for cultivation; it is highly improbable that many of the ex-soldiers from the more civilized parts of the Island will ever attempt to cultivate these lands, and Government's object will be defeated and much damage will be done to the forest, if the ex-soldiers are permitted to pass on their holdings to local practisers of shifting cultivation for destruction.

43. Mention has been made above of the "Healthshire Hills." The growth on these hills is typical of that on some thousands of acres of Crown Land. The formation is white limestone and the soil is very shallow, with the result that the height growth of the forest is extremely poor. Probably the commonest trees on the Healthshire Hills towards the eastern end, at any rate, are Cashaw (*Prosopis juliflora*) and Candlewood (*Cassia emarginata*). Round Port Henderson there are indications

that these species have been felled in the past, and they have sent up a satisfactory regrowth of coppice shoots with the result that the present stocking is by no means bad, and gives promise of forming a very useful potential firewood crop of extensive area within what is really a very short distance of Kingston, either by water or road.

44. One of the very few men that the writer saw on these hills stated that he had been given a lease by a Department of Government of an area of the forest for a goat farm, and a number of his goats were seen. The browsing of goats is one of the most destructive dangers to which a forest can be subjected and, in fact, where a poor type of fuel forest is subjected to goat browsing on any appreciable scale, the ultimate fate of that forest may be said to be sealed.

45. An area on which there is a certain amount of Government Crown Land is the Bull Head Mountain. A letter to Government from the Parochial Board of Clarendon expresses great anxiety on account of the rapid run-off of water from the hills, of which Bull Head is the most prominent, affecting adversely the flow of water in the Rio Minho. The writer has inspected the Bull Head Mountain and found that the top of the hills has been denuded of tree growth. This is ascribed largely to annual fires, often lighted, it is said, by graziers who pay nothing to Government for the grazing. For several years past the Assistant Conservator of Forests has attempted to grow trees on this mountain, but each year most of his young plants have been destroyed by fire. Clearly, afforestation without fire protection and without a protective staff backed up by an adequate Law is quite hopeless on a mountain like Bull Head, and in the absence of such protection, the inhabitants of Clarendon and other similarly situated localities may look forward with confidence to things going from bad to worse.

46. It may, no doubt, be said that two Laws- The Country Fires Law, 17 of 1902 and Afforestation Law, 33 of 1927- exist and that they afford suitable means of protecting the Crown Lands in Jamaica.

THE COUNTRY FIRES LAW 17 OF 1902.

Under Section 3 of this Law, the occupier of any land is bound legally to make a 25 foot fire line round any area which he intends to burn and to give notice of his intention to burn to occupiers of adjoining land.

The Surveyor General is the occupier of adjoining land in the case of lands on which numbers of fires are lighted annually. No record can be produced in the Surveyor General's Office of a single instance of a notice to burn having been received. The legal duty of clearing a 25 foot fire line is usually neglected.

Not a single case of an offender against these two essential provisions of the Law having been prosecuted by Government can be quoted from the records in the Surveyor General's Office. This does not strike the writer as being so surprising as might appear to be the case at first sight. The person who is responsible for instituting the prosecution of a tenant on Crown Land is, presumably, the low paid Bailiff. The result of prosecuting would be that the Bailiff would have to go with a witness or two to some rather distant Court which would be distasteful to him. Another result, if a conviction were obtained, would be that the offender ought to be evicted by the Bailiff who would thus lose 10% of the annual lease amount. Add to this the fact that long years of experience have taught the Bailiff that nothing will happen to him if he neglects to take any action, and the reason for large areas of Crown Land being devastated by fire to the destruction of the Forest, is not far to seek.

THE AFFORESTATION LAW, 33 OF 1927.

47. This Law appears to give the Governor wide powers. The Law clearly contemplates the declaration of private property to be Forest Reserve; so far this has never been done, and it seems unlikely that it ever will be done, in view of the obvious dangers to which it would lay Government open by way of compensation under Section 4. A mere statement of unfulfilled desire to cultivate or to fell trees could be construed into "any loss, detriment or other injury."

A fact which detracts from the practical, as opposed to the theoretical, value of the Act is that it contains no provision for offering to compound petty offences. It should hardly be necessary to take

a man, caught stripping a bit of bark off a tree before a Resident Magistrate, and the fact of having to do so is quite enough to deter anybody from reporting such an offence.

It does not appear to be stated in the Act that the offences against it are cognisable by the Police or by any other specified Government Officer.

48. In the absence of any whole-time Forest protective staff with specified powers laid down in a Forest Act, the amount of benefit that can accrue to a forest from the existence of a Law on paper is strictly limited.

49. Only one Reserved Forest, or strictly speaking, series of Forest Reserves has been notified so far. This is in the Blue Mountains, and the notification is No. 549, published in the Jamaica Gazette dated July 19th, 1928. Under this notification, some 67 blocks of land in St. Mary, St. Thomas, Portland and St. Andrew Parishes have been declared Forest Reserves. These blocks are mostly old properties forfeited for failure to pay taxes. They do not form one solid homogenous block of forest, owing to private property intervening between two blocks in a few places.

50. The boundaries of the Reserved Forest exist only on paper for the most part, and there is very little, if any, demarcation by means of cleared lines and cairns. Owing to the existence of private Estates, the boundary of the Reserve is irregular in the extreme. This is inevitable under the present circumstances, because the selection of the area for reservation had to be made in the Office from the list of forfeited lands, without any reference to what was desirable on the ground. In the Surveyor General's Office attempts have been made to arrive at a more regular and shorter boundary by putting on the map a line which would enclose a good deal of private land. Negotiations have been in progress with the owners of this private land with a view to its acquisition by Government by exchange or purchase. Not much real progress has been made up to date, and in the writer's experience, little progress is likely, so long as voluntary relinquishment of private property is treated as the basis for the acquisition of land required for a public purpose.

51. The present area of what is known as the Blue Mountain Forest Reserve is 30,710 acres. On the south side of the main ridge, most of the forest is over 5,000 feet above the sea. The growth here is not of large size, except in the bottoms of a few valleys running down from the ridge. One of the commonest species met with on the way up to Blue Mountain Peak, above Portland Gap, is a species of Podocarpus, known locally as Yacca. Very few trees over three feet girth, of any species, were seen on the way up to the Peak. There is an extensive block of evergreen forest on the Portland side to the north of the ridge and it extends much lower down the slopes on this side, and some big trees of the good timber species, such as Cedar (*Cedrela odorata*), Mahoe (*Hibiscus elatus*), Yacca, etc., are to be met with. The slopes on both sides of the main ridge are excessively steep, and on the south side, especially, which has been terribly denuded for the cultivation of Scallion, a sort of onion, and thyme and also for coffee, there have been numerous landslips. The slopes in question form part of the watershed of the Yallahs river, and the reason for all the flooding and depositing of silt that causes so much damage in St. Thomas Parish, is very easy to understand, for anyone who travels from Silver Hill, over the Cinchona Ridge, down into the valley of the Green River, and up past Whitfield Hall to Blue Mountain Peak.

52. The only thing which causes surprise to one who leaves the path and tries to scramble up the precipitous slopes, over the very loose shaly soil, is that the damage has not been greater than it has been. There are thousands of tons of the loosest possible soil waiting for the next abnormal downpour of rain to wash it down into the Yallahs Valley and its tributaries.

54. At Chincona and again at Whitfield Hall there are some fine specimens of Eucalyptus, some of which are *E. globulus*, the Blue Gum. Dimensions measured showed a height of 114 ft. and a girth of 11 ft. 4 inches, which shows what Blue Gum trees this soil of the Blue Mountains is capable of producing.

55. As a point of interest, it is recorded here that a species of *Eupatorium*, a weed which, within the last 20 years, has invaded a similar Blue Gum bearing soil and covered hundreds of acres on the Nilgiris or Blue Mountains of Southern India, is taking a firm hold in these denuded areas on the Blue Mountains of Jamaica. It is a good binder of the soil and a very rapid spreader; its progress should be watched with interest as it is thought that its natural spread, without any artificial assistance, may in course of time prove beneficial in covering some of the denuded slopes.

56. The demarcation, reservation and survey of Reserved Forests on the precipitous slopes of the Blue Mountains and, indeed, everywhere in Jamaica, is going to be an arduous tasks, if the proposals in Part III of this Report are carried out; it is trusted that this fact, and difficulties which will be encountered, will not be allowed to cause the shelving of a most essential undertaking.

57. It has already been stated that a few inspection paths have been made by the Assistant Conservator. The provision of more of these paths will be one of the first essentials, after the forests of Jamaica have been reserved. At present it is practically impossible even to inspect the interior of the forests of the Blue Mountains, or the Cockpit Country, a fact which accounts for their very existence. All that is needed are 2 ft. wide footpaths cut in the solid earth, after rough alignment with a DeLisle's Clinometer, or Ceylon ghat tracer.

PRIVATE LANDS.

58. The present state of affairs as regards tree growth on private lands, varies greatly in different localities. In some localities, such as those around Christiana in Manchester and the neighbouring districts in Clarendon, fuel has become scarce, and there are places where it costs 3 or 4 times as much to procure it now as it used to do some few years ago. On the other hand there are places, such as parts of Westmoreland, where the complaint is that the bush grows so fast and is so plentiful that difficulty and expense are involved in keeping it down.

59. Again, the rainfall, which affects all growth, is so very variable. One of the Honourable Elected Members of the Legislative Council jokingly pointed out to the writer that if his visit resulted in a decrease in the rainfall of Portland and a corresponding increase in St. Elizabeth.

60. In the majority of parishes, practically all land fit for producing valuable plantation products has been cleared for cultivation, as is very natural and right. A great deal of land, however, which is much too steep for any form of permanent cultivation has been disposed of to petty settlers, either permanently or on lease, and it is these men, who practice shifting cultivation for the production of foodstuffs, that do most of the damage nowadays, though, in years gone by, it was the clearance of forest for coffee growing on the shale soils of the Blue Mountains that caused the most serious and lasting damage, by way of erosion and the rapid run-off of rain water.

61. The writer has met several landowners and managers of estates in Jamaica, who are not only interested in protecting existing tree growth, but also in planting forest trees. The chief species which they are planting is Cedar (*Cedrela odorata*) and another popular species is Mahoe (*Hibiscus elatus*)

62. Generally speaking, the object of a private owner in planting timber trees is to provide for the future requirements of his own property. He does not usually aspire to Sylviculture or the production and scientific treatment up to the age of maturity of whole woods or crops of trees, though the writer has inspected at least one estate on which successful, regular plantations have been made.

63. The planting of trees by private owners is encouraged by Government, and nurseries in which hardwood timber species are raised for free distribution to anyone who wants them, are maintained in several places by the Assistant Conservator of Forests and the Agricultural Department, at Hope Gardens near Kingston. It is necessary, however, to point out in this report that it is too much to expect that the planting of a few thousand trees by the enthusiastic owners of properties for their own use, has or will have any very material effect upon the forest problems of Jamaica, either in their economic or protective aspects.

64. Whilst it is realized that it might almost amount to impertinence for anybody to try to teach a planter how to plant, yet in Part III of this Report, it is hoped to offer some advice on a possible way of raising crops of trees, as opposed to individual trees, either for timber or firewood, both cheaply and successfully.

PART III.

THE FUTURE.

65. From what has been written above it may be realised that in order that any Government may practice forestry successfully, the following essential requirements must exist:-

- (i) Properly constituted Reserved Forests within which all claims to rights have been enquired into and settled.
- (ii) A comprehensive Forest Law giving, amongst other things, power to settle claims to rights to constitute Reserved Forests, to declare certain acts to be illegal inside Reserved Forests, to prescribe penalties for the commission of these acts, and to give power to certain persons to enforce the Forest Law.
- (iii) A staff empowered by Law, and qualified by knowledge and experience to enforce the Law and protect the forest, and generally, to administer to the best advantage of Government and the people, the properly constituted Forest Estate.

66. The absence of any one of these essentials, will vitiate the other two. A perusal of this Report must lead to the conclusion that one or more of these essentials is absent in Jamaica and, if this is admitted, the first question for decision, is whether the conditions in that Island are such as to justify the provision of all three essentials.

67. The conclusion arrived at by the writer, as a result of his investigation, is that the justification does exist. It lies firstly, in the necessity for safeguarding such forests as still exist on Crown Lands for reasons of protection against erosion and flooding, secondly, in the necessity for stopping the unregulated felling of immature, valuable timber trees, thirdly, in the necessity for Government to assume the responsibility for seeing that the firewood forests, which at present exist within reasonable distance of Kingston, which is a growing town, are retained as a source of supply when required, in perpetuity, and fourthly, in the advisability for Government to start a modest Afforestation Scheme on land, some of which will have to be acquired, which has been denuded in the past, and which it is desirable to reclothe, in some cases for reasons of soil protection, and in others in order to build up a firewood supply to meet what may become a pressing need in localities of intensive cultivation of plantation products.

68. If, as is believed to be the case, there exists a very general feeling that something must be done to improve matters as regards forestry in Jamaica, the present would appear to be a most favourable time for making a beginning, if an allocation for this purpose can be made under one of the heads in the Loan Schedule. In this connection it is, however, necessary to point out that continuity of action is more important in the case of forestry than in that of many other activities, and that it would be quite fatal if an adverse vote were to result in a stoppage of funds some few years hence after a good beginning had been made. It is desirable to guard against this possibility.

69. As regards new legislation; the question arises as to whether amendments to existing Laws would suffice, or whether repeal and redrafting are advisable.

The existing Afforestation Law-No. 33 of 1927, is deficient in many essential particulars, e.g.,

- (i) It does not define any class of officer and give that class of officer the power and the duty to enforce its provisions.
- (ii) It makes no provision for settling claims to rights by a special officer (The Forest Settlement Officer), before notifying an area as Reserved Forest.
- (iii) It makes no provision for the seizure and disposal of property concerned in forest offences.
- (iv) It does not give power to offer the acceptance of a compounding fee in lieu of prosecution.

70. It is felt very strongly that Jamaica would be well advised to legislate a fresh, basing a new Forest Law upon the Forest Act which has been working satisfactorily in Madras for the past fifty years. If such an Act were passed and brought into operation, and if use were made, where necessary, of the Public Lands Acquisition Law, half the difficulties which have confronted Government

whenever the question of giving effect to advice given on forest matters, by Mr. Hooper in 1885, or by one or other of the Committees at later dates, would disappear.

71. It is suggested that a Forest Settlement Officer is ready to hand in the shape of the present Assistant Conservator of Forests, whose designation should be changed accordingly.

72. The correct procedure for to-day is precisely that advocated by Mr. Hooper fifty years ago—"Reserve, demarcate, survey and protect against fire, theft and trespass." No attempt must be made to do any of these things in the office in Kingston; they will involve most arduous an out-door work, often under considerable physical difficulties, a fact which it is urged that Government should realize with sympathy in connection with any field work which its officers are called upon to carry out in the remaining Crown Lands of Jamaica.

73. The order of procedure should be roughly as follows:-

- (a) Selection on the ground and temporary demarcation with cheap cairns of an area to be reserved.
- (b) Notification and description of the area in the Jamaica Gazette, and call upon all those claiming any sort of rights within the area to lay them before the Forest Settlement Officer before a certain date.
- (c) Enquiry into rights and settlement of them, either by rejection or acceptance, and acquisition where possible, and recording of results.
- (d) Eventually final reservation and notification in the Gazette and application of all provisions of the Forest Act.
- (e) Finally, survey and permanent demarcation by means of cairns and a cleared line.

74. Next, as to protection against fire, theft and other dangers:-

A few whole-time Forest Guards are necessary. These men should not be local residents of the locality in which their work lies, and they should be subject to transfer from time to time. They should be men accustomed to working in rough and difficult country. It will usually be desirable for two men to patrol together; one of them might be on a lower scale of pay than that of a Forest Guard, and he might be designated "Forest Watcher."

75. Experience shows that a Forest Guard's confidence, prestige and utility are increased, if he is provided with a non-military, simple khaki uniform and belt.

76. It is considered that there is a strong case for having a trained Forest Officer in Jamaica. Without such an officer, the public would have little interest or faith in any forestry scheme, and quite rightly so, in the writer's opinion, for the proposals contained in this Report are based on the supposition that a trained officer will be employed permanently, and in the absence of such an officer, it would be as foolish to embark upon a forestry scheme, as it would be to embark upon a bridge building scheme without a trained engineer, or a hospital scheme without a trained doctor.

77. A suggestion, which is purely tentative, in view of the writer's very incomplete knowledge of the Forest Services in the Colonies, is that some officer without about eight years service in some tropical country, where he has had personal experience of what is more commonly referred to as "taungya," or the raising of forest crops in conjunction with crops of foodstuffs, should be lent to Jamaica for three years. A younger trained member of the Colonial Forest Service might suitably be attached to the experienced officer during the last of the three years, in order to gain local experience, and he might then take over the Jamaica forests. Such an officer should not have to look forward to spending the rest of his Service in Jamaica; this would not be in the interests of either Jamaica, or the officer himself. It is felt that there should be a free circulation of Forest Officers amongst the smaller British possessions at any rate, and that forest work in these places should, if possible, be subject to inspection by one or more peripatetic Conservators. Many years experience of forestry in the tropics makes it possible to visualize stagnant and unhappy state of affairs coming into existence occasionally in the absence of some such arrangement.

78. It must not be supposed for one moment that what the writer is advocating can be done all at once. It has taken several hundred years for Jamaica to reach its present state as regard deforestation, and what is attempted in this Report is to take a broad outlook for many years ahead. It is considered essential to start operations on a small scale at first, but to start them at once. To this end it is suggested that the catchment area of the Kingston Water Supply should be tackled first. If a

certain measure of success can be met with in this area, it will serve as a demonstration area, easily accessible to those in authority, and also to those private estate owners anxious to increase the area of their woodlands.

79. The order of procedure for forming a Reserved Forest has been outlined briefly above. Let us assume that the stage has been reached at which Government is faced with the ownership of sufficient land in the catchment area, and the existence of a large number of small cultivators whose land they have acquired for the public purpose of afforestation. These men will have to be provided for, either in land settlement areas elsewhere or else on the spot. Now it so happens that Jamaica is more happily situated than most other countries for practising a system of afforestation combined with growing of foodstuffs. Nature is so prolific in this Island that things will grow in the most surprising way. If a green bamboo is used as a yam stake, it will take root and form a new bamboo clump, and an inspection of some of the existing nurseries, already referred to, shows that seed of many valuable tree species, whether sown on a very steep seed bed in the open, on the hills, or on a level bed on the plains, under shade and subjected to drip from the trees, will give a high percentage of germination. What is advocated is that the practitioners of shifting cultivation should be allotted specific areas each year in which to grow their foodstuffs, on condition that they should help the Forest Officers in the raising of young trees, and in their protection from weeds and other dangers for two years, after which they would move on to another area. A remission of rent might, perhaps be allowed on a sliding scale dependent upon the percentage of established young trees existing at the end of two years. It is impossible in this Report to go into the details of this system, but they have been discussed briefly with Mr. E.M. Brown, the present Assistant Conservator of Forests, and several experienced gentlemen have told the writer that a similar system has been practised in Jamaica for the growing of guinea grass, and also for the introduction of coffee, and that there is no reason why it should not succeed in the case of forestry.

80. A fire line of sufficient width would have to be cleared and burnt around the catchment area, and a Forest Guard and Forest Watcher appointed to protect the area, and also to grow the trees and supervise the cultivators.

81. It is necessary to be very chary of trying to lay down the species of tree to be grown in any special locality. Experiments are required, and this is one of the main reasons why a trained Forest Officer is necessary. A few commonsense rules may, however, be laid down:-

- (i) Consider first the object of management. It is merely to clothe an area for protective purposes, the species most easily and quickly grown are indicated. In the catchment area roseapple (*Eugenia Jambos*) and bamboo appear to grow like weeds, and *Cassia siamea* would also grow quickly from seed, if the soil were loosened.
It has been noticed that roseapple leaves are being attacked by some black rust fungus. Perhaps, the Agricultural Department can say whether this fact is serious enough to bar the deliberate increase of the species artificially.
- (ii) Study the species growing in the locality naturally, and choose those which are doing best. Height growth is an indication of the depth of soil, and if the existing trees on any area are all stunted and small, it is not a bit of use expecting that planted trees will do any better.
- (iii) Invariably consult the old, local, residents, however humble.
- (iv) Realise that it is no more reasonable to expect a bad seedling to grow into a good tree, than it is to expect a half-starved, stunted slum child to grow into a fine man. Thus if poor, lanky tree seedlings, with an undeveloped root system, are obtained from a nursery and then have their roots exposed to the air, and are then planted with their roots doubled up in too small a hole, they cannot be expected to flourish.

82. Having suggested that the Kingston catchment area should be the first area to be turned into Reserved Forest, it is now necessary to indicate some of the other areas which require reservation and protection. They are:-

The Blue Mountains Ridge,
The Cockpit Country,

The Healthshire Hills,
The Bull Head Mountain,

The Dry Harbour Mountains,
The Black Grounds of Trelawny

The Portland Ridge,
The John Crown Mountains.

No doubt there are other areas, but, with one exception, those named above, are areas where Government already possess Crown Lands.

83. The exception is the Black Grounds in Trelawny. This is a denuded area which once used to be covered with trees. Parts of it are at an elevation of some 2,900 feet. There is a proposal before Government for acquiring a large area on these Black Grounds for a Land Settlement Scheme. The writer happened to meet the Land Settlement Officer in the area in question on the day when they were both inspecting it. The area is not far from a tract of country round Christiana and spreading into Clarendon, where there is already a shortage of firewood. It is felt that a modest afforestation scheme, using fuel species, might be undertaken by Government on these Black Grounds. Trees would be grown in conjunction with field crops, and in addition to this, large areas would be available for permanent cultivation under a Land Settlement Scheme.

84. The writer would like to see an experiment made on the Black Grounds with the Blue Gum (*Eucalyptus globulus*). This is an extremely quick growing tree which reproduces itself readily from coppice shoots when it is cut down, and produces a phenomenal yield of firewood on a rotation of some fifteen years. It is a question as to whether the elevation on the Black Grounds would prove too low for Blue Gum; very possibly it would. In other respects the locality and soil appear to resemble those in another country where this species grows magnificently, and a small experiment is most desirable. Seed should be obtained by writing to Australia, presumably to the Chief Forrest Officer, Canberra.

85. In addition to a small experiment with Blue Gum, other species chosen in accordance with the simple rules given above, should be tried on the Black Grounds, bearing in mind that the primary object of management there, should be to grow a crop of trees suitable for firewood on a short rotation; species known to produce coppice shoots readily, after felling, will be necessary.

86. For the Cockpit Country and the Dry Harbour Mountains, a very simple working plan is needed as soon as possible. A purely tentative working plan could be prepared at once. The available area should be divided up into, say, 15 coupes. Local knowledge and enquiry should enable the Assistant Conservator to decide arbitrarily the girth limit below which each of the saleable species is immature. Each year one coupe, have natural boundaries, such as ridges, paths, etc., would be prescribed for working and all trees of the selected species having a girth of or above the limit fixed for each species, would be marked for felling by the Assistant Conservator, and an attempt would be made to sell them standing.

The fact that this would reduce the existing supply of railway sleepers would have to be faced. It would also reduce greatly the number of sleepers cut from immature trees, which is exactly what the Chief Engineer of the Railway desires. Lastly, it would safeguard the Forest Capital, as represented by the trees, and would lead towards a state of affairs in which only the Interest on the Capital was being cut, and not the Capital itself.

At the very least, one Forest Guard and one Forest Watcher will be needed to start with for the Cockpit Country.

87. In the Healthshire Hills, the lease of an area for a goat farm should be cancelled at once, and the goats removed. A Forest Guard and Watcher are needed for this area and Portland Ridge combined.

88. Bull Head Mountain requires only rigid protection from fire and grazing for the present at any rate. Given this, it is hoped that Nature will reclothe the hill gradually. A whole-time Forest Guard is needed here, and if he can be given additional areas to protect, he should be given a Watcher.

89. For the Blue Mountains and John Crow Mountains, it is felt that two Forest Guards and two Forest Watchers should be provided.

90. The suggestions made above as regards staff, are on the supposition that the existing arrangement of employing part-time men called Rangers, some of whom are also Bailiffs, will be done away with, and on the supposition that the staff will work directly under a head Forest Officer.

91. Much thought has been given as to the particular Department of Government under which the Forest Staff should work. It has been suggested that would be better to place it under the

Agricultural Department, than under the Lands Department and Surveyor General, as it is at present. The considered opinion of the writer is that, since no case can be made out at present for having a separate Forest Department, the Forest Staff had better remain under the Surveyor General, who is in charge of the Crown Lands which it is proposed to turn into Reserved Forests. It should hardly be necessary to add that there should be the very closest co-operation between the Forest Staff and the Agricultural Department, and if the latter could see its way, after a trained Forest Officer has been appointed, to allow him a nursery site at Hope Gardens, it would be an extremely good thing. A labourer would be required of the nursery.

92. What has gone before, has dealt rather fully with most of the points on which, as stated in the Introduction, Government asked for advice, e.g., deforestation, protection of existing forest lands, re-afforestation and the Kingston Water Catchment area. As regards the matter of windbelts and protection against north winds, this is much more a planter's question than a question of forestry. This being so, the opinion of several leading planters has been obtained. It is found that they are practically unanimous in agreeing with the writer that in a country which is so mountainous as is Jamaica, it is quite impossible to lay down any hard and fast rule about windbreaks which, in most cases, cannot be relied upon to give any protection against northerns. Instances are quoted of areas, apparently protected on all sides by hills, in which one of the several "blows" has laid flat the bananas in one part of the area, perhaps the middle, whilst not a plant has been damaged in other parts. Each part of every property is a study in itself.

93. For what it is worth, which is not much, the suggestion is thrown out that if a planter who is short of firewood, decides to try a windbreak in any place, he might sow the seed of *Cassia siamea* in, say, twelve lines, 5 feet apart, after loosening the soil. When the trees become big enough for firewood, he might cut the trees on one line each year, in the reasonable hope that the coppice shoots which would spring up, would perpetuate his windscreens, whilst he benefited from a continuous supply of firewood.

94. As regards encouraging the planting of Cedar (*Cedrela odorata*) and Mahoe (*Hibiscus elatus*) the following advice is offered, as promised in paragraph (64): the advice is, however, applicable to other species, also subject to the general commonsense rules given in paragraph (81). It is well known that Cedar is one of the very best woods for shingles which, without any treatment, will last for some forty years in Jamaica. Mahoe is a general utility timber, the properties of which are as well known in Jamaica, as are those of Cedar. There will always be a local market for these two species, and the suggestion is offered that planters who have suitable land available, and tenants who wish to grow foodstuffs, might do much worse than set aside a few acres, not necessarily all in one block, for the production of these timber species or, if the circumstances indicate it, for the production of firewood. In either case the system of combining forestry and agriculture, as outlined in paragraph (79) for the Kingston Catchment Area is advocated. An escapement between trees of 6 feet by 6 feet would be suitable on the understanding that thinning for the sake of the crop, and not only when some poles are required for use, would be carried out when necessary. To attain success, something more than an order to tenants would be necessary in the way of supervision and instruction.

95. It would be found both interesting and easy for a planter to have his own nursery bed, 4 feet wide and any length, raised 9 inches above the ground level with the loose soil held in place between little walls of interlaced, split bamboo.

96. In case of a firewood plantation, direct sowing of seed in patches, in which the soil had been loosened should suffice. Probably *Cassia siamea*, which is so common along Kingston roads and in many parts of the Island, would grow in most places, but the good old rule of studying which species are already thriving locally, should not be lost sight of. As for seed, the children of tenants ought to be glad to collect it for a very small remuneration.

97. In the case of Government, some of the timber-bearing areas which have been devastated by tenants, ought to be tackled. When a trained officer is appointed, he will wish to experiment with Mahogany, and some of the sleeper hardwoods, and also Bitter Damsel (*Simaruba* sp.) which the Match Factory requires.

98. There is a small pocket of alluvium at Angel's Pen, just above the big dam on the Rio Cobre, where an experimental teak plantation at 6 feet by 6 feet, ought to be tried, if the proposal to

acquire a strip along this river is carried out. Mr. Brown knows the place. Stumps with 9 inches of root and two inches of stem and as thick as a finger, should be used after raising plants in a nursery. Existing growth should be clear felled, and after selling anything saleable, the rest should be burnt on the area. Teak seed may be obtained from the Working Plans Conservator, Ootacamund, India, and he may be asked to send enough for an experimental plantation of 2 acres.

A. WIMBUSH,
Chief Conservator of Forests, Madras
And Forest Adviser, Jamaica.
23rd December, 1935.