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TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

REVENUE DEPARTMENT

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GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

25th September 1878, No. 1,575.

Read the following paper:—

No. 321. Extract from the Proceedings of the Government of India, in the Department of Revenue, Agriculture and Commerce,—dated Simla, the 12th September 1878, Circular No. 52-F.

Read the following extracts from the Report of the Royal Botanical Garden, Calcutta, for the year 1877-78:—

* * * * * * *

5. *India-rubber.*—The seedlings of Para rubber received in the beginning of 1877 were partly retained in this garden and partly sent to the Cinchona plantation in Sikkim. Several of these plants have died during the year. The plants that still remain here (14 in number) are, however, healthy, and have grown fairly well. Every care is being taken of them, and I hope soon to be able to report that they have been increased in number by artificial propagation; but former experience has made me wary of allowing cuttings to be made until the parent plants have had plenty of time thoroughly to establish themselves. A quantity of Ceara rubber plants, collected in South America by Mr. Cross and sent to this garden by Sir Joseph Hooker, were received along with the Para rubbers. About one-third of the plants in this consignment were found on arrival to be in bad condition or dead. Of the remainder, five were sent to the Cinchona plantation, and the balance were retained here. One of the plants here is now ten feet high, and the others vary in height from two to five feet; but they all look more or less weak and lanky, as if the climate were too damp for them. This plant (a species of *Manihot*) was found by Mr. Cross in quite a different kind of country from the Para rubber, and it appears more likely to succeed in India than the latter. My object, both with the Para and Ceara rubbers, will be to propagate as large a stock of young plants of each as possible, to find out spots with climates suitable for each, and to have small plantations made wherever efficient supervision can be secured in such places.

6. *Vanilla.*—Further experience has only strengthened my conviction that *vanilla* cannot be grown as a crop in the climate of Calcutta with any prospect of success. I observe that even in Bangalore, where for a time it was supposed to have promised well, a similar conclusion has lately been arrived at. The plants now in the garden will, of course, be attended to; but I do not think it is worth while to go to any further expense in attempting to make a plantation of it to be conducted on commercial principles.

7. *Ipecacuanha.*—A number of plants of ipecacuanha have been sent to the Botanical Garden at Singapore, which enjoys a climate that ought to suit ipecacuanha perfectly. A considerable stock of young plants is kept on hand at the Cinchona plantation ready for issue to any applicant. But, like *vanilla*, I fear this valuable drug can never be grown successfully as a crop in any part of Bengal. We have been perfectly successful in propagating the plant from root, cuttings and seed, and it grows luxuriantly under cover. But out of doors the low night temperature of the cold weather proves too severe for it. During the year, 26 pounds of the dried root, taken from plants grown in frames under Mr. Jaffrey's care at Rungbee, were sent to the medical depôt for use, previous trials having established the excellence of the Sikkim-grown drug.

8. *Rhœa.*—The Government of India having decided again to offer a prize for the invention of a machine to clean rhœa fibre, a couple of acres of ground were put under this plant in order that intending competitors might be supplied with

green stems to work with. The ground having been trenched and manured, the crop offers to be a good one; but rhœa does not appear to me to grow with such luxuriance here as in the drier climate of Saharanpur, where the competition for the Government prize is to be conducted.

9. *Baobab, Bamboo, and other Paper Fibres*.—The curious baobab tree is a native of Africa, but appears for a long time to have been a favorite with Mussulmans in India. Large trees of it are found planted near Calcutta, Patna, Agra, and at many other places in India. Baobab bark began some years ago to be largely imported into London from the Portugese settlements in Africa, and proved an excellent paper fibre. At the suggestion of Sir Joseph Hooker, I made three years ago a small plantation of it with the view of testing the possibility of growing it sufficiently cheaply to be used as a paper fibre. For the past two years the plants put out here received a rough kind of cultivation, and the grass between them was regularly cut; but, as this could hardly be afforded in a plantation conducted on commercial principles, I did not think it fair to the experiment to continue even the little cultivation which the plants had hitherto received. During the past year, the young baobabs have therefore had to fight their own battle, and it is quite clear that the majority of them are going to be mastered by the course, deep-rooting grasses which infest the soil everywhere in the plains of Bengal. Such plants as enjoy the shade of a large tree in the neighborhood of the plantation continue to look very fairly healthy, but those that stand in the open look very sickly. If baobab were to be grown to a profit, it would be hardly feasible to give it cultivation, however rough, after the first year, and it might not always be possible to give it shade. Considering, moreover, the comparatively slow growth of the species (a tree of 20 years old grown in the open girths, about 3½ feet at the base and is about 15 feet high), I am driven to the conclusion that baobab is not likely to afford in India a sufficiently cheap paper fibre. My own impression is that a plant yielding an annual crop is more likely to fulfil the financial conditions of success than any perennial which, like baobab, yields a crop only after many years. Acting on this conviction, I sent to the India Office samples of four common Indian plants, and suggested that their value as paper fibres should be ascertained. The samples consisted of the stem and leaves of (1) the *bhabar-ghas (Eriophorum comosum)* of the North-West Provinces, which is so largely used as a material for ropes in Upper India; (2) of *Saccharum spontaneum*, a tall, coarse grass which under the name of *kash*, is only too abundant in waste places over a large part of India; (3) of *Imperata cylindrica*, the well-known *ooloo*, the commonest grass in Lower Bengal; and (4) of *Typha elephantina*, the *hogla* of Bengalies, a large bulrush abundant all over Lower Bengal in marshy places and by the sides of tanks and streams. *Eriophorum*, not growing naturally in Lower Bengal, would reach a seaport weighted by the cost of long carriage, and may therefore practically be excluded from competition in the export market; but the other three are common plants all over the Gangetic delta, and could be brought to Calcutta in any quantity and at very low rates. The four samples were reported on by Mr. Routledge, of the Ford Paper Works, near Sunderland, who has devoted so much attention to the utilization of the young shoots of bamboo as a paper fibre. Mr. Routledge states that "all four will unquestionably make paper." "*Eriophorum* is," he says, "the best and most easily-worked of the four, as a small quantity of bleach brings it into good order." "The ultimate fibre is," he continues, "very fine and delicate, rather more so than *esparto*, and of about the same strength. The yield (42 per cent.) is somewhat less, I think." Mr. Routledge goes on to say, "it will make a quality of paper equal to *esparto*. The remainder of Mr. Routledge's report is not very encouraging, but I give it *verbatim*, for I know that the increasing deficiency in the supply, and consequent rise in price of materials suitable for paper-making, have been exciting a good deal of interest for some time, and under such circumstances the records of failures, entire or partial, are nearly as useful as the records of success.

"The grass marked *Saccharum spontaneum* ranks next to *Eriophorum* in quality; it is more tender, and certainly not equal to *esparto*; it yields 44 per cent. of fibre.

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"The grass *Imperata cylindrica* I do not think suitable for paper, certainly not for printing, although it may suit for what are termed small hands and rough packing papers. It is full of small joints and knots (especially the lower portions of the stalk), which result in harsh, woody sheaves. It gives a yield of 41 per cent.

"The *Typha latifolia* gives a very strong fibre when purged of the glutenous compounds living in its cellular tissue; but, in consequence of this mass of gluten, the yield is very small (only 28 per cent.); it is also extremely difficult to bleach, and loses most of its strength when subjected to that process.

"I do not consider that it would pay commercially to attempt to treat any one of these fibrous materials for conversion into 'stock' for European use, although very possibly, if procurable in abundance and at cheap rates, they might be employed for paper-making, locally, with advantage.

"To come into this (the home) market, any material must be superior to *esparto* in quality, as no matter how cheap the raw material may be in India, the cost and charges for converting it into stock and transport to Europe will bring its price to afford any profit to the producer as high or nearly as high as *esparto*.

"The importer, therefore, must be prepared to sell his stock as cheap or nearly as cheap as *esparto*, reduced to the same condition of stock, and must also give the inducement of superiority of quality."

In the Resolution on my last annual report it was suggested that I should get from the Orissa and Chittagong coasts specimens of the wiry grasses growing on the beach. This has been done, but no report on the samples has yet been got. I propose to continue to give attention to this subject of paper fibre, and hope to note the results in future reports.

It will be remembered that several years ago, Mr. Routledge, an English paper-maker, drew the attention of Government to the value as a paper material of the fibre yielded by the immature shoots of bamboo. Healthy bamboo clumps, as everybody in India knows, send up during every rainy season a certain number of new shoots which, growing with enormous rapidity, in a few weeks, attain their full height, and afterwards slowly harden, and develope leaves. Mr. Routledge expressed his belief that by a simple treatment in this country a "stock" might be extracted from these shoots which might be profitably transmitted to England for manufacture into paper. During the past two or three years, I have put Mr. Routledge's proposals about coppicing bamboo to a practical test, and, in my last report, I recorded my observations so far as they had gone. I shall now bring them up to date; but before doing so, it may be convenient to reproduce what I wrote last year. I therefore quote from my last report:—

"It is essential to the success of Mr. Routledge's process that the bamboo shoots be quite young and succulent, and the great difficulty which at once presented itself to persons with any knowledge of the mode of growth of Indian bamboos was that such shoots, being produced in moderate quantity from each clump, and only during a limited season of the year, the proposed paper stock-making machinery must, for a large part of the year, necessarily lie idle. To meet this difficulty, Mr. Routledge suggested that bamboo clumps might, by proper treatment, be induced, after most of their old shoots had been cut away, to send up from the stools thus bared, regularly and irrespective of season, crops of succulent shoots suitable for conversion into paper-stock. Mr. Routledge's expectations imply a very complete change of habit in the bamboo; for it is pretty well known that bamboo clumps, if entirely cut down, yield for several years but few and small succulent shoots, and, in fact, not unfrequently die. In order, however, to submit the proposed scheme to a trial under my own eye, six clumps of *Bambusa Balcooa* were cut down last year, *i.e.*, in 1876, at the beginning of the rains between 10th and 20th June, when the buds of the young shoots of the season had completely formed and were nearly ready to burst through the soil. Soon after the cutting of the old stems, these buds developed into shoots which grew with characteristic

rapidity. These were allowed to grow until they began to show symptoms of becoming hard, and on 21st July they were all cut down. They were at once weighed with the following result :—

	Number of young shoots.	Weight in pounds.
Clump No. 1	11	166
Ditto 2	7	102
Ditto 3	6	78
Ditto 4	9	100
Ditto 5	5	42
Ditto 6	12	192
Total ...	50	680

This gives an average of 113 pounds of wet young shoots per clump. The time of cutting was the most favorable that could have been chosen, and the crop of shoots yielded was probably as good as it would have been had the clumps remained untouched by the knife. Judging from the size of the clumps, I calculate that at most 80 similar clumps could be grown on an acre of ground. This allows an area of 576 superficial feet to each clump, and such close planting would probably necessitate manuring. Taking the yield of these six clumps as an average and excluding all loss from death and accident, the yield on an acre during the first year of cutting would therefore be 9,066 pounds of fresh young shoots. It must not be forgotten that freshly-cut bamboo shoots are extremely succulent, and that the amount of dry paper-stock that could be got from them would bear a very small proportion to their original weight. An additional difficulty that attends the scheme is that, since only fresh succulent shoots will answer, and these are of too high specific gravity to float, the cost of land carriage to the factory (a very heavy one in Bengal) would have to be incurred. The cut clumps above-mentioned were well cared for; leaf mould and tank soil were laid round them; and, as compared to similar clumps in the forest, they had the great advantage of immunity from fire and from being grazed on by cattle. Since their young shoots were cut, a considerable number of thin woody twigs have arisen from the bases of the old stems. No fresh young root shoots have, however, appeared. Some such will doubtless appear at the usual time, which would be the beginning of the ensuing rainy season. These shoots shall be cut at the time recommended by Mr. Routledge, *i.e.*, when they are just beginning to become hard and woody, and with the cutting of these the crucial part of the experiment will begin. The results shall be duly recorded in next annual report."

In the beginning of the rainy season of last year, the brushwood of thin woody twigs which had been produced by each clump was cut off, but amongst the twigs there were none of the soft, succulent shoots proceeding from the underground stem which are required for Mr. Routledge's process. The early rain of the present season was particularly favorable to the production of young shoots, and the clumps have just again (10th July 1878) been cleared of every twig produced by them since the previous cutting. The result is that, just as last year, the most of the growth consists of hard woody twigs which proceed from the bases of the stems cut two years ago. There are only a few of the succulent shoots proceeding from underground, and the total yield of materials succulent enough for Mr. Routledge's process is 120 pounds, or an average of 20 pounds of green material per clump. In a pamphlet published on the subject, Mr. Routledge estimates that the green raw material dries to one-fourth of its weight, and that the dry material gives 60 per cent. of good paper-stock. I am therefore in a position to give the yield of paper-stock of these six clumps during three years. The yield during the first year was about 17 pounds per clump, equal (allowing 80 clumps to the acre) to about 1,360 pounds per acre. During the second year, the yield was nothing, and during the third year it was 3 pounds per clump, or equal 240 pounds per acre. Mr. Routledge estimates that (according to a method of planting which he proposes, but which I believe to be quite impracticable) the yield per acre would be 6 tons, *and that this yield would be annual*. The value of the paper-stock delivered in England would

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be from £20 to £25 per ton, so that, even assuming (which is by no means the case) that green bamboos are of very little value, the proposed new industry does not present a hopeful financial aspect.

10. *Carob and other economic trees.*—A smaller quantity of the seed of the carob of the Mediterranean (the *Ceratonia siliqua* of botanists) was sent some time ago to the garden to be sown, with the view of introducing this tree into Bengal. The pod of this species, as Government are aware, contains a sweet nutritious pulp which forms an excellent food for cattle and horses. But the tree does not naturally affect a climate and soil in the least like those of the Gangetic delta, and I never looked on the attempt to add it to the fodder plants of Bengal as at all likely to succeed; and, as a fact, the majority of the seedlings damped off before they were six inches high. About 50 seedlings remain, some of which have been planted out, while the others, which are too small for planting out, remain in pots. But although all have been duly cared for, none are vigorous. An American tree, which also yields a sweet nutritious pod, has been much more successful than the carob. This is the *Pithecolobium saman*, a native of Peru, which, from its supposed property of inducing local showers, is in that country known as the "rain-tree." An exact description and explanation of the phenomenon which gave rise to this name has only quite recently been given in the columns of the English periodical, *Nature*, by Dr. Dyer, who quotes from the eminent South American traveller, Mr. Spruce, as follows: "A little after seven o'clock, we came under a lowish spreading tree, from which, with a perfectly clear sky overhead, a smart rain was falling. A glance upwards showed a multitude of cicadas sucking the juices of the tender young branches and leaves, and squirting forth slender streams of limpid fluid. We had barely time to note this when we were assailed by swarms of large black ants, which bit and stung fiercely and obliged us to beat a treat, my companions calling out as they ran '*tamia-caspi! tamia-caspi!*' When we had shaken off our assailants, I ventured to approach the spot so near as to make out that the ants were greedily licking up the fluid as it fell." There are in the garden two sets of this tree; one consisting of five trees about eleven years old, and the other consisting of 84 trees which were planted in an avenue four years ago. The tree is an extremely rapid grower, and seems perfectly at home in the climate and soil of Lower Bengal. It has a thick trunk, which, at a comparatively short distance from the grounds, divides into large branches, which form a spreading and very dense crown. This habit, together with the softness of the timber, make the tree of little value as a source of material for building, but it would probably answer very well as a firewood tree, and as a shade tree I know nothing to equal it in Bengal. It grows faster than any indigenous tree known to me, and the only introduced tree which rivals it is the *Casuarina equisetifolia*. The five older trees in this garden girth on an average seven feet nine inches at three feet from the ground; while of the four-year old trees, which are planted 32 feet apart as an avenue on either side of a road 20 feet wide, the heads now meet across the road and afford an excellent shade. The average height of these younger trees is about 20 feet, and the average girth of their stems at three feet from the ground is 29 inches. The older trees have this year, for the first time, given seed; the pod is quite as sweet as that of the carob, and is abundantly produced, and altogether I consider *Pithecolobium saman* a much more hopeful source of cattle fodder than the carob, while, as a rapid grower, it is unrivalled. Quantities of seeds of various species of *Eucalyptus* were sent by the Government of India during the year for trial in the garden. Of these a considerable proportion failed to germinate, and of those which did germinate the majority of the seedlings damped off during the rainy season, and at the end of the year only three plants remained alive. This result is quite in accordance with former experience, which goes to show that the project of ameliorating the malarious climate of Lower Bengal by the free planting of *Eucalyptus* is perfectly utopian. The water-logged alluvial soil and hot steamy climate of this part of India are totally unsuited to any species of these Australian trees which has yet been tried. Moreover, it seems highly doubtful whether, even where it grows vigorously, the *Eucalyptus* has any especial effect on malaria. I understand that

many species of *Eucalyptus grow well at Shillong and at several of the stations on the North-Western Himalaya*—a fact which in itself offers a strong argument *against the probability* of their success in a climate so totally different as is that of Calcutta.

Madras.	Central Provinces.
Bombay.	British Burmah.
Bengal.	Mysore and Coorg.
North-Western Provinces and Oudh.	Ajmere.
Punjab.	Assam.
	Hyderabad.

ORDER.—Ordered, that a copy of the above be forwarded to the Local Governments and Administrations named in the margin, for communication to the officers of the Forest and other Departments.

Ordered, also, that a copy be forwarded to the Superintendent of Forest Surveys and to the Comptroller-General for information.

(True Extract.)

(Signed) C. L. TUPPER,
Offg. Under Secy. to the Govt., of India.

No. 322.

ORDER THEREON, 25th September 1878, No. 1,575.

Forests, No. 19.

COMMUNICATED to the Board of Revenue and Conservator of Forests.

(True Extract.)

(Signed) L. A. CAMPBELL,
Under Secretary to Government.

To the Board of Revenue,
& the Conservator of Forests.

Ext. W. H. French,

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Circular No. 52 F.

Extract from the Proceedings of the Government of India, in the Department of Revenue, Agriculture and Commerce,—dated Simla, the 12th September 1878.

FORESTS.

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"It is essential to the success of Mr. Routledge's process that the bamboo shoots be quite young and succulent, and the great difficulty which at once presented itself to persons with any knowledge of the mode of growth of Indian bamboos was that such shoots, being produced in moderate quantity from each clump, and only during a limited season of the year, the

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proposed paper stock-making machinery must, for a large part of the year, necessarily lie idle. To meet this difficulty, Mr. Routledge suggested that bamboo clumps might, by proper treatment, be induced, after most of their old shoots had been cut away, to send up from the stools thus bared, regularly and irrespective of season, crops of succulent shoots suitable for conversion into paper-stock. Mr. Routledge's expectations imply a very complete change of habit in the bamboo; for it is pretty well known that bamboo clumps, if entirely cut down, yield for several years but few and small succulent shoots, and, in fact, not unfrequently die. In order, however, to submit the proposed scheme to a trial under my own eye, six clumps of *Bambusa Balcooa* were cut down last year, *i. e.*, in 1876 at the beginning of the rains between 10th and 20th June, when the buds of the young shoots of the season had completely formed and were nearly ready to burst through the soil. Soon after the cutting of the old stems, these buds developed into shoots which grew with characteristic rapidity. These were allowed to grow until they began to show symptoms of becoming hard, and on 21st July they were all cut down. They were at once weighed with the following result:—

	Number of young shoots.	Weight in pounds.
Clump No. 1	11	166
Ditto 2	7	102
Ditto 3	6	78
Ditto 4	9	100
Ditto 5	5	42
Ditto 6	12	192
Total ...	50	680

This gives an average of 113 pounds of wet young shoots per clump. The time of cutting was the most favourable that could have been chosen, and the crop of shoots yielded was probably as good as it would have been had the clumps remained untouched by the knife. Judging from the size of the clumps, I calculate that at most 80 similar clumps could be grown on an acre of ground. This allows an area of 576 superficial feet to each clump, and such close planting would probably necessitate manuring. Taking the yield of these six clumps as an average and excluding all loss from death and accident, the yield on an acre during the first year of cutting would therefore be 9,066 pounds of fresh young shoots. It must not be forgotten that freshly-cut bamboo shoots are extremely succulent, and that the amount of dry paper-stock that could be got from them would bear a very small proportion to their original weight. An additional difficulty that attends the scheme is that, since only fresh succulent shoots will answer, and these are of too high specific gravity to float, the cost of land carriage to the factory (a very heavy one in Bengal) would have to be incurred. The cut clumps above-mentioned were well cured foss leaf mould and tank soil were laid round them; and, as compared to similar clumps in the forest, they had the great advantage of immunity from fire and from being grazed on by cattle. Since their young shoots were cut, a considerable number of thin woody twigs have arisen from the bases of the old stems. No fresh young root shoots have, however, appeared. Some such will doubtless appear at the usual time, which would be the beginning of the ensuing rainy season. These shoots shall be cut at the time recommended by Mr. Routledge, *i. e.*, when they are just beginning to become hard and woody, and with the cutting of these the crucial part of the experiment will begin. The results shall be duly recorded in next annual report."

In the beginning of the rainy season of last year, the brushwood of thin woody twigs which had been produced by each clump was cut off, but amongst the twigs there were none of the soft, succulent shoots proceeding from the underground stem which are required for Mr. Routledge's process. The early rain of the present season was particularly favourable to the production of young shoots, and the clumps have just again (10th July 1878) been cleared of every twig produced by them since the previous cutting. The result is that, just as last year, the most of the growth consists of hard woody twigs which proceed from the bases of the stems cut two years ago. There are only a few of the succulent shoots proceeding from underground, and the total yield of materials succulent enough for Mr. Routledge's process, is 120 pounds, or an average of 20 pounds of green material per clump. In a pamphlet published on the subject, Mr. Routledge estimates that the green raw material dries to one-fourth of its weight, and that the dry material gives 60 per cent. of good paper-stock. I am therefore in a position to give the yield of paper-stock of these six clumps during three years. The yield during the first year was about 17 pounds per clump, equal (allowing 80 clumps to the acre) to about 1,360 pounds per acre. During the second year, the yield was nothing, and during the third year it was 3 pounds per clump, or equal 240 pounds per acre. Mr. Routledge estimates that (according to a method of planting which he proposes, but which I believe to be quite impracticable) the yield per acre would be 6 tons, *and that this yield would be annual*. The value of the paper-stock delivered in England would be from £20 to £25 per ton, so that, even assuming (which is by no means the case) that green bamboos are of very little value, the proposed new industry does not present a hopeful financial aspect.

10. *Carob and other economic trees.*—A smaller quantity of the seed of the carob of the Mediterranean (the *Ceratonia siliqua* of botanists) was sent some time ago to the garden to be sown, with the view of introducing this tree into Bengal. The pod of this species, as Government are aware, contains a sweet nutritious pulp which forms an excellent food for cattle and horses. But the tree does not naturally affect a climate and soil in the least like those of the Gangetic delta, and I never looked on the attempt to add it to the fodder plants of Bengal as at all likely to succeed; and, as a fact, the majority of the seedlings damped off before they were six inches high. About 50 seedlings remain, some of which have been planted out, while the others, which are too small for planting out, remain in pots. But although all have been duly cared for, none are vigorous. An American tree, which also yields a sweet nutritious pod, has been much more successful than the carob. This is the *Pithecolobium saman*, a native of Peru, which, from its supposed property of inducing local showers, is in that country known as the "rain-tree." An exact description and explanation of the phenomenon which gave rise to this name has only quite recently been given in the columns of the English periodical, *Nature*, by Dr. Dyer, who quotes from the eminent South American traveller, Mr. Spruce, as follows: "A little after seven o'clock, we came under a lowish spreading tree, from which, with a perfectly clear sky overhead, a smart rain was falling. A glance upwards showed a multitude of cicadas sucking the juices of the tender young branches and leaves, and squirting forth slender streams of limpid fluid. We had barely time to note this when we were assailed by swarms of large black ants, which bit and stung fiercely and obliged us to beat a retreat, my companions calling out as they ran '*tamia-caspi! tamia caspi!*' When we had shaken off our assailants, I ventured to approach the spot so near as to make out that the ants were greedily licking up the fluid as it fell." There are in the garden two sets of this tree: one consisting of five trees about eleven years old, and the other consisting of 84 trees which were planted in an avenue four years ago. The tree is an extremely rapid grower, and seems perfectly at home in the climate and soil of Lower Bengal. It has a thick trunk, which, at a comparatively short distance from the ground, divides into large branches, which form a spreading and very dense crown. This habit, together with the softness of the timber, make the tree of little value as a source of material for building, but it would probably answer very well as a firewood tree, and as a shade tree I know nothing to equal it in Bengal. It grows faster than any indigenous tree known to me, and the only introduced tree which rivals it is the *Casuarina equisetifolia*. The five older trees in this garden girth on an average seven feet nine inches at three feet from the ground; while of the four-year old trees, which are planted 32 feet apart as an avenue on either side of a road 20 feet wide, the heads now meet across the road and afford an excellent shade. The average height of these younger trees is about 20 feet, and the average girth of their stems at three feet from the ground is 29 inches. The older trees have this year, for the first time, given seed; the pod is quite as sweet as that of the carob, and is abundantly produced, and altogether I consider *Pithecolobium saman* a much more hopeful source of cattle fodder than the carob, while, as a rapid grower, it is unrivalled. Quantities of seeds of various species of *Eucalyptus* were sent by the Government of India during the year for trial in the garden. Of these a considerable proportion failed to germinate, and of those which did germinate the majority of the seedlings damped off during the rainy season, and at the end of the year only three plants remained alive. This result is quite in accordance with former experience, which goes to show that the project of ameliorating the malarious climate of Lower Bengal by the free planting of *Eucalyptus* is perfectly utopian. The water-logged alluvial soil and hot steamy climate of this part of India are totally unsuited to any species of these Australian trees which has yet been tried. Moreover, it seems highly doubtful whether, even where it grows vigorously, the *Eucalyptus* has any especial effect on malaria. I understand that many species of *Eucalyptus* grow well at Shillong and at several of the stations on the North-Western Himalaya—a fact which in itself offers a strong argument against the probability of their success in a climate so totally different as is that of Calcutta.

Madras.	Central Provinces.
Bombay.	British Burma.
Bengal.	Mysore and Coorg.
North-Western Provinces and Oudh.	Ajmere.
Punjab.	Assam.
	Hyderabad.

ORDER.—Ordered, that a copy of the above be forwarded to the Local Governments and Administrations named in the margin, for communication to the officers of the Forest and other Departments.

Ordered, also, that a copy be forwarded to the Superintendent of Forest Surveys and to the Comptroller General for information.

(True Extract.)

C L Tupper

Offg. Under Secretary to the Government of India.

To The Secretary to the Government of Madras

1575/7

Revenue department
No 4198

1878.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE,
AGRICULTURE AND COMMERCE.

FORESTS.

RESOLUTION.

Circular No. 52 F.

Dated Simla, the 12th September, 1878.

SUBJECT.

FORWARDS, for information, extracts from the report of the Royal Botanical Garden, Calcutta, for the year 1877-78, containing an account of the experimental cultivation in the garden of certain special plants.

Govt. Central Branch Press, Simla.—No. 431, R., A. & C.—15-9-78—220.