

**COLONIAL REPORTS – MISCELLANEOUS**

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**No. 38.**

**REPRINT**

**OF**

**A REPORT**

*(Written in 1884).*

**UPON THE**

**PRESENT POSITION AND PROSPECTS OF THE AGRICULTURAL  
RESOURCES OF THE ISLAND OF ST. HELENA.**

**BY**

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NOTE. — This Report was written by Mr. Morris (now Sir D. Morris, Director of Agriculture in the West Indies) in January, 1884. There have been many recent requests for copies, and the report is consequently reprinted.

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**Presented to both Houses of Parliament by Command of His Majesty.**

*November, 1906.*

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**No. 38.**

**ST. HELENA**

**(AGRICULTURAL RESOURCES).**

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St. Helena lies in lat. 15° 55' S., and long. 5° 42' W. It is 1,140 miles from the African coast. It is 1,800 miles from the American coast, 700 miles south of the Island of Ascension, 955 miles due south of the equator, and about 4,000 miles from. England.

It was discovered 21st May 1502 by the Portuguese; held by the Dutch until 1651, when the East India Company took it. It was transferred to the Crown in 1833. It has been in British possession about 232 years.

Historically, it is chiefly remembered in connexion with the exile of Napoleon I. After the defeat at Waterloo he was placed a prisoner at St. Helena from 15th October 1815 until his death, 5th May 1821, a period of 5½ years. His body was at first interred near Longwood, but afterwards (1840) removed to France.

The area of St. Helena is about 45 square miles; its extreme length, 10¼ miles, and extreme breadth, 8¼ miles. Of the 28,800 acres of which the island consists, the greater portion suitable for cultivation is in private hands. The Crown lands, with the exception of Longwood Farm and a few other places, are barren wastes on the outskirts of the island, incapable of cultivation.

To understand aright the present condition of the surface of St. Helena it may be mentioned that three fairly distinct zones, each possessing its own special characteristics, are observable both in the geological nature of the soil as well as in the plants which affect them. These are: –

1. *The Coast Zone.* – This, in the present day, is "the dry, barren, soilless, frowning, lichen-coated, rocky outskirts of the island." At one time it is said to have been covered with abundant vegetation, and with trees drooping over the tremendous precipices that overhang the sea.

The barren coast zone, at present, extends about a mile to a mile and a half around the island. Deep, wide valleys, and rocky, almost inaccessible, ridges run from the central ridge towards the sea, breaking up the coast zone into numerous, almost detached, prominences and ledges. It is absolutely

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devoid of vegetation except prickly pear, a few plants of *Mesembryanthemum*, and the rare indigenous *Pelargonium*, *Pharnaceum*, and *Tripteris*. On the Barn there are straggling bushes of the scrub-wood (*Aster glutinosus*, ROXB.), which is probably the most abundant of the indigenous plants of the rocky coast.

The plants on the coast zone are so scattered and for the most part so lodged in crevices and hollows that they do little to redeem the barren, burnt-up appearance which the island presents from the sea.

2. *The Middle Zone.* – This extends about three-quarters of a mile inland from the boundary of the coast zone. Its surface is less rocky, with shallower valleys, and more grassy slopes. The elevation is from 400 feet to about 1,800 feet; the temperature is lower; and numerous Australian, Cape, and American shrubs and trees have become established, forming thickets of considerable size. One of the chief features of this middle zone are the furze-clad slopes, with occasionally the indigenous gum woods, and, in moist sheltered hollows, the larger ferns. Longwood and Deadwood, Plantation House, and West Lodge may be said to occupy characteristic positions in this zone. The English brooms, brambles, willows, and poplars, Scotch pines and gorse bushes, Cape of Good Hope bushes, Australian trees, and American weeds have driven out most of the indigenous plants from this belt. The tendency of these introduced plants is to encroach more and more upon the higher lands where the indigenous flora still remains. As regards the larger trees, such as pines and willows (acacias), they appear to be spreading downwards in the direction of the valleys; following, no doubt, the distribution of their seeds by the action of the trade winds.

3. *The Central Zone.* – This occupies a certain extent of land on each side of the central ridge (once the rim of the Sandy Bay volcano). It is altogether not more than about 3 miles long and about 2 miles wide. In some places, as on the southern slopes of the central ridge, the rocks are very precipitous, while in others the land possesses an undulating, "hummocky" character, with grassy slopes, meadows, hayfields, a few farms and gardens, and well wooded glens of oak and acacias. On the extreme crest of the central ridge, extending from High Peak to Rock Rose, there is still left a portion of the indigenous forest, with cabbage trees and ferns, and wild olive (*Nesiota elliptica*), angelica, lobelia, and the delicate campanulate *Wahlenbergia*.

Generally the soil in the central zone is rich though not very deep; the climate is particularly cool, the sky being continually obscured by mist and cloud.

[The character and extent of the zones mentioned above may be gathered from the accompanying map.]

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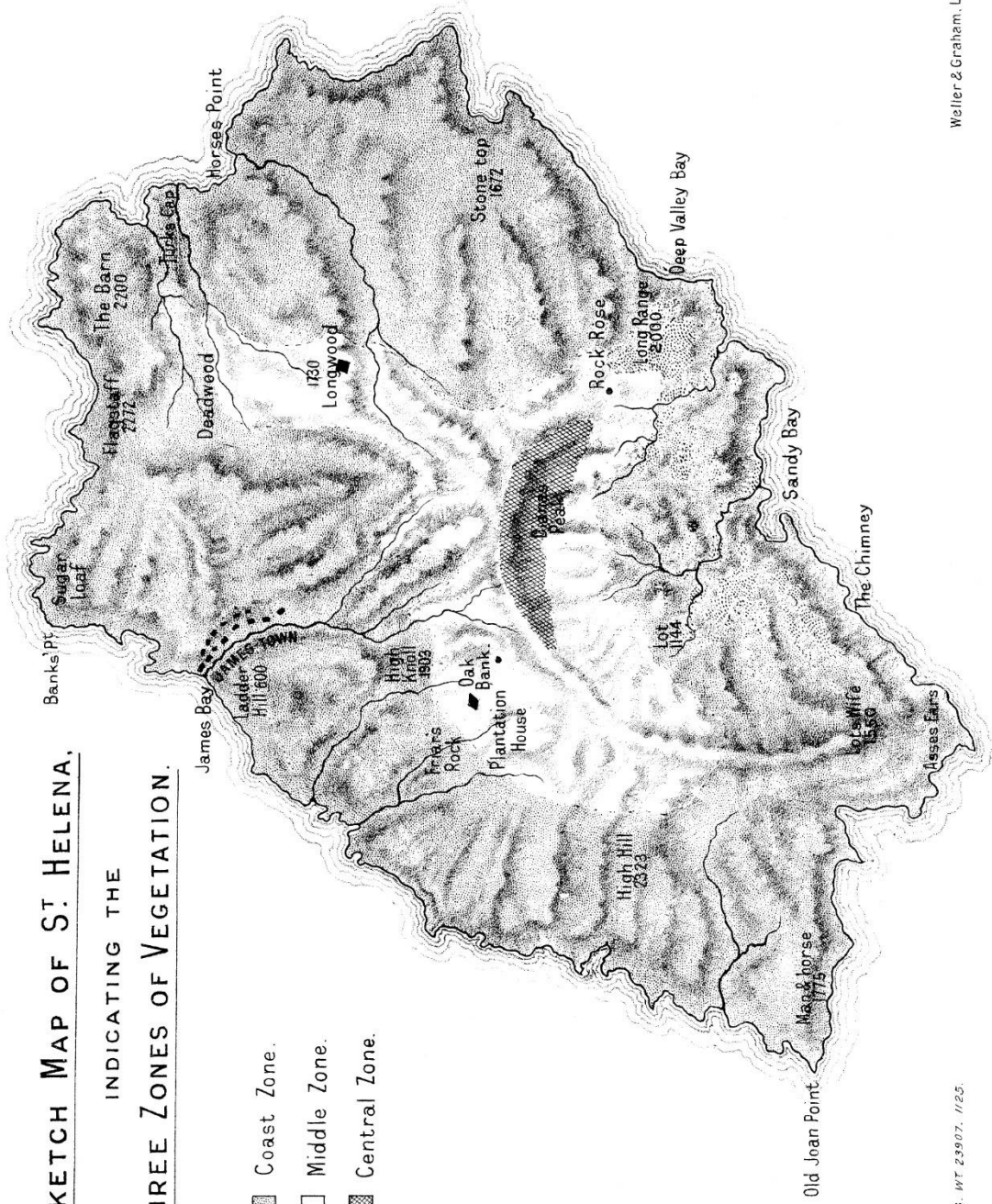
[Map below – Ed.]

# SKETCH MAP OF ST. HELENA.

INDICATING THE

## THREE ZONES OF VEGETATION.

- Coast Zone.
- Middle Zone.
- Central Zone.



I have previously mentioned that St. Helena contains an estimated area of 28,800 acres. Of this area probably 20,000 acres, or more than two-thirds, are composed of barren rocky wastes or clayey slopes totally unfit in their present conditions for any agricultural operations.

*Aloes*, *Furcraea*, and plants of this kind may be induced to grow in the more warm and sheltered valleys; and possibly, several hardy trees may be established in other places under careful and proper treatment; but unless pioneering vegetation of this kind is first spread over these wastes to gradually reclaim them they must continue to remain in their present condition.

About 8,000 acres are in pasture and hay land. The tendency is to throw more and more land out of cultivation and place it in grass. This is a retrograde step as regards the agricultural interests of the island, but it is inevitable under the influences which obtain at present.

The country houses which in the East India Company's time were inhabited by prosperous merchants and officials, and surrounded by well kept gardens and orchards, are now fast falling into decay and becoming ruinous. The cultivated areas around them are simply converted into grazing lands, and a few cattle and sheep are the only indications of life for miles round.

Under forest, both of indigenous and introduced trees, in detached and struggling patches, there may be altogether about 400 acres.

Under cultivation, with root crops, forage, orchards, and gardens, there are not quite 300 acres.

This last area, viz., 300 acres, practically represents all the land now used for raising crops and for contributing to the food supply of the inhabitants.

It will be noticed that this is not all the land capable of being thus utilized. Under a more efficient system of agriculture, and with the introduction and application of capital, the area under crops and garden cultivation might be increased tenfold. In fact, fully one-half the land under pasture and hay land might be broken up and utilised for crops, provided a tangible and apparent purpose were in view, and a market found for the produce.

The present population of St. Helena according to the census: of 1881, excluding the garrison and shipping, is about 4,500. Of this number more than one-half (2,435) live in Jamestown.

As regards occupation, there are only 70 persons (males) returned as farmers and small cultivators, and 477 (males) as labourers.

During the last 10 years large numbers of labourers and small cultivators have emigrated to the Cape and Natal, and at the present time labour is scarce and expensive. Wages range from

2s. to 2s. 6d. per day, but the quality even at this price is not quite satisfactory.

The rainfall at St. Helena is very variable. In Jamestown Valley and the coast zone it is probably as low as 25 or 30 inches. In the middle zone, as at Longwood, the mean annual rainfall (by observation) is 44 inches. On the central ridge it is no doubt higher and may be placed at 55 to 60 inches.

As regards climate St. Helena stands pre-eminent in possessing a remarkably fine and healthy climate. The temperature is uniform; observations at Longwood, at an altitude of 1,764 feet, record the mean temperature for five years at 61.4° Fahrenheit, the lowest being 52° and the highest 77.6° Fahrenheit.

The mean height of the thermometer in the different months ranged from 57.07° in September to 66.24° in March, making an average difference of only 9.17 between the hottest and the coldest months.

The trade winds from the south-east blow interruptedly for about 10 months of the year, keeping the air pure and cool.

In respect to its climate I regard St. Helena as a most valuable station for recruiting health, and it is a matter of regret that its resources in this respect have not been more fully appreciated.

During the period when the East India Company held the island, owing to its being so important a station on the then route to India, "it was reared in the lap of luxury." Merchants and officials possessing large incomes were settled in the island; they occupied handsome residences situated in the country parts, and public works and buildings were maintained in a high state of efficiency. The number of vessels calling at the island were reckoned by thousands in the year. Being sailing ships they remained a considerable time in port re-fitting and re-victualling, and they spent annually large sums of money which circulated amongst all classes of the community.

When, however, the Suez Canal was opened and the Cape route was practically abandoned by the largest and best ships to India and the East, and when again the naval and military establishments were reduced to the lowest ebb, then there set in a period of financial depression and general distress which has extended to the present day.

The island has never been able to produce any article of export, and owing to its geographical position and its close connexion with shipping the attention of its inhabitants has been called away from any serious attempt to cultivate the soil for the sake of profit.

Hence now, when the number of ships calling at the island is becoming yearly less and less, there has settled upon the inhabitants a hopelessness of fighting against circumstances which is most distressing. Before they fully realized that they must look

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to local industries and to the resources of the soil for the true prosperity of the island, the spirit of enterprise, and with it the necessary capital for developing those resources, had fled.

I append herewith a return showing the number and tonnage of vessels which have called at St. Helena during the last 10 years: –

| Year. | No. | Tons.   |
|-------|-----|---------|
| 1873  | 717 | 464,637 |
| 1874  | 684 | 469,231 |
| 1875  | 605 | 412,149 |
| 1876  | 582 | 393,761 |
| 1877  | 664 | 449,724 |
| 1878  | 669 | 505,750 |
| 1879  | 602 | 425,811 |
| 1880  | 564 | 430,925 |
| 1881  | 525 | 385,911 |
| 1882  | 497 | 409,400 |

From this return it will appear that the falling off in the number of ships calling at the island during the last 10 years is very considerable. As compared with 1873 there is a falling off of 220 in the number of ships which called in 1882, and a falling off of 55,237 as regards the tonnage. The gradual substitution of large steamers for sailing ships is another very serious blow to St. Helena. And again, although steamers continue to call they seldom require anything, as with the new improvements in ice-chambers and refrigerating machinery they can carry supplies of fresh meat and fresh vegetables to last a long voyage.

Under these circumstances the outlook in St Helena is a very serious one.

Unless the Home Government is prepared to give the island some assistance and to support it while endeavouring to develop the resources of its soil I fear there is little hope in the future.

In the endeavour to keep the expenditure within the income, and to pay off a debt contracted some years ago, the present Governor has been most careful in husbanding every penny paid into the exchequer, but in spite of his utmost endeavours the income is becoming less and less every year; public buildings, roads, and public works generally are suffering from want of funds; the establishment, reduced to its lowest standard, is small, ill-paid, and sharing in the general depression; education, religion, local institutions, and in fact all that make up the moral, social, and commercial machinery of a community are suffering from want of means, and are yearly less and less able to meet the demands made upon them.

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I feel it my duty to speak thus plainly of the present state of affairs in St. Helena, as I trust that some means may be devised for bringing about a radical and decisive change in them.

Speaking from my point of view, and after a careful consideration of the soil, climate, and general resources of the island, I am led to take a hopeful view of those resources provided they are developed in such a manner as to place the island in fair competition with other countries.

I look entirely to the soil for the elements necessary to bring prosperity to St. Helena. But the people require to be shown what those resources are; they need to be taught how to use those resources aright, and they require to be encouraged and assisted while so engaged.

I would recommend, in the first instance, that an intelligent and competent gardener be sent to the island to take up the entire question of the revival of agricultural pursuits, and that if the local Government is unable to support such an officer and a small staff, that a grant be made for the purpose by the home Government.

With regard to suggestions for the improvement of the general agriculture of the island, I shall, in treating of the plants now under cultivation there, offer such hints as may be conducive to their better treatment, and to a better return from the areas under cultivation.

Taking into account the remoteness and comparative isolation of the island, the reduced condition and great want of knowledge which characterises most of the cultural operations undertaken by the smaller settlers, as well as the need of the assistance which only a practical and well trained gardener can give them, I am disposed to recommend that a small establishment be again organized with Plantation House as a centre, and that a good gardener be placed in charge of it. The work of such a man would combine the maintenance of nurseries and of a small garden at Plantation House with a keen interest in the general development of all cultivation undertaken in the island. He would introduce and raise for distribution the numerous valuable plants not already in the island; he would show experimentally the best methods adopted for their successful cultivation, and he would give every assistance to cultivators in teaching them how to prepare the land and plant trees; how to prune them and keep them in good health; how to treat the numerous diseases which unhappily have appeared and been allowed to attack unchecked the numerous industrial plants in the island; how to prepare the produce of plants for exportation; and, in short, to promote by every means in his power the revival of cultural operations in St. Helena and to endeavour to place them in a healthy and prosperous condition.

Under present circumstances I am unable to suggest any other means of accomplishing the objects above enumerated, and I fear that even with these means it will take a long time to

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bring things back to such a condition as will have an appreciable effect upon the finances of the island. The probable yearly expenditure in connexion with the employment of a trained gardener will amount to about 400/. This would include his own salary and the wages of three or four men. There is a small cottage at Plantation House which might be converted into a residence for the gardener, and there is a propagating house and land suitable for nurseries close at hand.

At first little, if any, reimbursement in aid could be expected. Later, however, as plants became ready for distribution, and a keener interest was created in the cultivation of new products, a small charge made for plants sold to cultivators might bring in about 50/. per annum. Ultimately the wages of the men might be covered by the sales of plants; but in any case the establishment could not be expected to be self-supporting amongst so small and comparatively speaking so poor a community.\*

In addition to the work above mentioned the Government gardener might do much towards placing the Crown lands in a position to bring in a larger revenue, and to assist in the planting of the large areas of denuded land which at present are becoming less productive every year.

It was noticed more than a hundred years ago that the excessive cutting down of the indigenous forest had had an appreciable effect upon the climate of the island; and especially that the springs rising in the highlands of the central ridge had become gradually diminished in volume and regularity. Oaks and Scotch firs were introduced in 1749, and planted at an elevation of about 2,000 feet, where they are growing luxuriantly to this day. Numerous acacias, and notably the Port Jackson willow, many Cape trees and Australian shrubs, have been established, and form the chief vegetation at a mid-elevation.

Since the time of the East India Company the lands above 2,000 feet have been gradually denuded, so that at the present time only inaccessible peaks and steep, precipitous, and rocky slopes, unsuitable for pasturage or for cultivation, remain in natural forest.

At about 2,000 feet, and down to about 1,500 feet, there is a belt, fairly well maintained, of Australian and Cape trees; but as the tendency of these is to propagate themselves at lower elevations or down the slope of the hills the upper areas remain, untouched.

The lands on the higher slopes, inasmuch as they afford good hay grass are eagerly sought by farmers, and hence the tendency is to extend as much as possible the area under hay grass, and to cut down in every possible locality the indigenous trees.

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\* At present there is a small sum expended in the maintenance of a small garden in Jamestown which might be added to the above for working them under one officer.

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I would suggest that a boundary be marked from the top of the central ridge, extending, say, 500 yards down the slope to the northward, and this should be permanently maintained in forest; and where at present denuded, that it be carefully and systematically replanted.

This belt might begin at the Old Picquet House, the eastern termination of the central ridge, and extend to the westward, under High Peak, Old Telegraph, Sandy Bay Ridge, Stitches Ridge, the Three Peaks, to High Ridge and Long Ground Ridge. The high road running under the northern slope of the central ridge might form a convenient boundary for this belt; but in cases where it comes close to the ridge, as at Telegraph and Sandy Bay Ridge, the boundary might fall below the road.

Latterly the island has suffered very severely from drought, numerous springs having been almost dried up. It is probable that such conditions may be repeated if the process of denudation is not immediately stopped, and, if the central ridge, where the chief streams of the island take their rise, is not re-clothed with trees. The beds of the streams should also be well shaded by suitable trees to prevent excessive evaporation, and all ponds and reservoirs should be similarly treated.

It is needless to add that blue gums, or any member of the genus *Eucalyptus*, is very unsuitable to plant near springs and streams. These trees act practically as force pumps; and several instances have come under my notice where springs and small rivulets have been dried up by the wonderful powers of absorption possessed by their roots.

As the best and most economical means of reforesting the denuded slopes of the island would be to utilise the numerous native and foreign trees already yielding large quantities of seed, I append here a list of the principal trees which may be used for such purposes: –

| Common Name. | Scientific Name.                | Elevation suitable for Growth. |
|--------------|---------------------------------|--------------------------------|
| Kei Apple    | Aberia Caffra, HOOK. f. & HARV. | Mid.                           |
| Mahoe        | Paritium tiliaceum, ST. HIL.    | Lower.                         |
| Redwood      | Melhanian erythroxylon, AIT.    | Mid.                           |

|                     |                              |        |
|---------------------|------------------------------|--------|
| Margosa             | Melia Azedarach, L.          | Lower. |
| Caffre or Red Date  | Harpephyllum caffrum, BERNH. | Mid.   |
| Tree Pittosporum    | Pittosporum undulatum, VENT. | Mid.   |
| Cape Coral Tree     | Erythrina caffra, THUMB.     | Mid.   |
| Red Coral Tree      | Corallodendron, L.           | Lower. |
| Coral Tree          | Schotia tamarindifolia, AFZ. | Mid.   |
| Fine-leaved Acacia  | Acacia dealbata, LINK.       | Mid.   |
| Acacia              | Acacia decurrens, WILLD.     | Mid.   |
| Port Jackson Willow | Acacia longifolia, WILLD.    | Mid.   |
| Black Acacia        | Albizzia Lebbeck, BTH        | Lower. |
| Black Boy           | Albizzia lophantha, BTH.     | Mid.   |
| Madras Thorn        | Pithecolobium dulce, MART.   | Lower. |

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*List of Principal Trees – cont.*

| Common Name.         | Scientific Name.              | Elevation suitable for Growth. |
|----------------------|-------------------------------|--------------------------------|
| Loquat               | Eriobotrya japonica, LINDL.   | Mid.                           |
| Rose Apple           | Eugenia Jambos, L.            | Mid.                           |
| Red Gum              | Eucalyptus viminalis, LAB.    | Mid.                           |
| Blue Gum             | Eucalyptus Globulus, LAB.     | Mid.                           |
| Indian Almond        | Terminalia Catappa, GAERTN.   | Lower.                         |
| Assegai Wood         | Curtisia faginea, AIT.        | Mid.                           |
| Privet or Iron Wood  | Canthium sp.                  | Mid. and Highest.              |
| Purple-fruited Olive | Olea laurifolia, LAMK.        | Mid.                           |
| White or Wild Olive  | Nesiota elliptica, HOOK. f.   | Mid.                           |
| True Olive           | Olea europaea, L.             | Mid.                           |
| Snail Tree           | Hakea gibbosa, CAV.           | Mid.                           |
| Oak                  | Quercus Robur, L.             | Mid.                           |
| Evergreen Oak        | Quercus Ilex, L.              | Mid.                           |
| Cork Oak             | Quercus Suber, L.             | Mid.                           |
| Casuarina            | Casuarina equisetifolia       | Mid.                           |
| Norfolk Island Pine  | Araucaria excelsa, R. BR.     | Mid.                           |
| Brazil Pine          | Araucaria brasiliensis, RICH. | Mid.                           |
| Cypress              | Cupressus sempervirens, L.    | Mid.                           |
| China Pine           | Cunninghamia sinensis, RICH.  | Mid.                           |
| Bermuda Cedar        | Juniperus bermudiana, L.      | Mid.                           |
| Cluster Pine         | Pinus Pinaster, AIT.          | Mid.                           |
| Stone Pine           | Pinus Pinea, L.               | Mid.                           |
| Cape Yew             | Podocarpus elongata, L'HER.   | Mid.                           |
| Camphor              | Cinnamomum Camphora, NEES.    | Mid.                           |

It will be noticed that most of the trees mentioned above are suitable for mid-elevations, these being the areas which, at the time of their introduction, required to be replanted. Since then, however, large areas on the highest lands have been cleared of their indigenous plants, and for these it might be desirable to introduce trees of a hardy character and capable of withstanding strong winds. Also in the hot and dry valleys of

Jamestown and Ruperts several valuable trees might be planted, suitable for the conditions which obtain therein.

For the latter situations, the Divi-divi (*Caesalpinia coriaria*); the Lignum-vitae (*Guaiaicum officinale*); the Cashaw (*Prosopis juliflora*); the West Indian Ebony (*Brya Ebenus*), and various species of *Ficus* might be planted to afford shade and shelter, as well as give some returns in economic productions.

*Cinchona*. – The proposal to introduce the cultivation of *Cinchona* into St. Helena appears to have been made, in the first instance, by the late Dr. Roxburgh, who, as far back as 1814, recommended that seeds of *Cinchona officinalis* be obtained from South America, and that after plants had been established at St. Helena they should be transmitted to India.

Sir Joseph Hooker, having on two occasions, namely, in 1839 and 1843, had favourable opportunities of forming an opinion respecting the resources and climate of St. Helena, when Sir

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Charles Elliott in 1864 began to develop planting operations in the island by the introduction of new and valuable plants, it occurred to him that *Cinchona*, if properly tried, was likely to lay the foundations of a remunerative and successful industry.

To undertake experiments a skilled gardener Mr. J.H. Chalmers, was sent out from Kew in 1869, who, having been supplied with seeds, succeeded within a short period in raising several thousand *Cinchona* plants in nurseries at Plantation House. Soon after a nursery was established at Newfoundland (altitude 2,400 feet), in the immediate neighbourhood of the highest peaks and of the only uncleared natural forest remaining in the island.

Mr. Chalmers succeeded altogether in raising about 10,000 plants from seed; and of these possibly more than one-half were planted out either on the slope above Newfoundland and under Action's Peak; or, on the Peak itself.

This portion of the island it may be explained lies along the inclines of the central ridge, of which Acton's Peak, Diana's Peak, and Cuckold's Pit Peak form the culminating points. The general elevation is between 2,500 and 2,700 feet; the mean annual temperature rather below 60° Fah.; and the soil composed of a rich, black, vegetable mould – peat – overlying marl or decomposed volcanic rock. At this elevation the ridge is bathed in moisture for at least three days of every week; and thus favoured, as pointed out by Sir Charles Elliott, it has become covered with a luxuriant growth of ferns and other plants usually found in the home of *Cinchonas* in South America.

The prospect for *Cinchona* at first was full of promise; and indeed if the cultivation had been attempted at an earlier period when there was a larger area of indigenous forest to select from and when plantations might have been established on the northern and more sheltered slopes of the central range the results might have been very different.

As it was, the plants put out on the terraces at the foot of Actaeon's Peak began to die off, and, driven to a last resort, the cultivation was ultimately confined to the narrow ridges of Actaeon's and Diana's Peaks, which, in many places, are only a few feet wide and fully exposed to the strong trade-winds which usually blow in St. Helena for about 9 or 10 months in the year. Here the soil on the surface was of a promising character, being

composed of rich vegetable humus formed by the decayed leaves and stems of tree-ferns and native plants. Below, however, there was nothing but a cold, wet, indurated or slightly friable marl, very unsuitable for the growth of Cinchonas, and which in Ceylon and India is known by experience to develop rot or canker in the roots, and to destroy every plant in contact with it. In his last report on the subject, dated 12th December 1871, Mr. Chalmers rightly attributes the large percentage of losses amongst his plants to the superficial nature

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of the soil, and reports that "they invariably died soonest in shallow ground, and, on the contrary, lived longest where the soil was of greatest depth." Further, he remarks, "there is nothing, either in the climate or situation, of an unsuitable character; the soil alone seems to be at fault, being insufficient for the further development of the plants."

Out of about 5,000 plants put out by Mr. Chalmers between January 1869 and November 1871, at the latter date there were only 540 of all ages then remaining. These were as follows: –

|                                                |            |
|------------------------------------------------|------------|
| <i>Cinchona succirubra</i> , over 2 feet ..... | 221        |
| <i>Cinchona succirubra</i> , over 6 feet ..... | 84         |
| <i>Cinchona officinalis</i> over 2 feet .....  | 81         |
| <i>Cinchona officinalis</i> over 6 feet .....  | 3          |
| Number of both kinds under 2 feet .....        | <u>151</u> |
| Total.....                                     | <u>540</u> |

Further experimental trial was stopped by the reduction of the establishments effected by the late Admiral Patey, and Mr. Chalmers left the island.

From 1872 up to the date of my visit the Cinchona trees still living had received some attention, but practically their cultivation was abandoned.

I went up to the central ridge with the Governor and Colonel Phillips, RE., on the 31st July, and spent the day examining the soil and noticing the condition and state of the Cinchona trees still remaining.

Of the trees planted by Mr. Chalmers there were 40 fine trees of *C. officinalis*, from 8 to 20 feet high; of *C. succirubra* there were 116 trees, from 8 to 20 feet high. The largest tree of all was a red-bark tree, *C. succirubra*, which measured 18 inches in circumference at 1 foot from the base. Except a few trees in exceptionally sheltered spots, they were all much damaged by wind, and presented a stunted and half-starved condition.

The ridge on which they were growing formed a portion of the rim of the old volcanic crater of Sandy Bay. On the southern side there was a steep, almost perpendicular, wall of rock, about 100 to 250 feet deep, reaching down to broken lands and ravines clothed with ferns, briars, and the low, bushy growths of cabbage trees, jelico, wild olive, and lobelia. On the northern and western sides the slopes, in places, were somewhat easier, but in no place was the ridge more than about 20 feet or 30 feet across. In many places, indeed, it was so narrow that it appeared like an old castle wall, clothed with vegetation.

The length of the ridge on which Cinchona had been attempted was altogether under 4 mile in a direct line.

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Under the most favourable circumstances it was not possible to place more than about five or seven acres under cultivation in Cinchona; but in view of the very unsuitable nature of the subsoil and the large mortality which had taken place amongst the young plants, it is very undesirable to attempt any further experiments. According to the statement of a very intelligent native gardener, trained by Mr. Chalmers, who has been employed since at Plantation House and in occasionally looking after the Cinchona plants on the ridge, more than 90 per cent. of the plants put out were lost owing to the unsuitable nature of the soil.

I visited the ridge again on the 1st August, and spent the day in exploring the lands in the immediate neighbourhood of the peaks, with the view of finding land offering better facilities for Cinchona planting than the ridge itself. In this I was disappointed. Except on the crest of the ridge there is no vegetable deposit or surface soil likely to grow Cinchona, the soil elsewhere being very shallow and immediately overlying rock or cold impervious clay.

Summing up the results of my inquiry, I am of opinion that, while the first impressions were favourable to the possibility of growing Cinchona on the highest peaks in St. Helena, the character of the subsoil, together with the exposed position of the locality, would entirely preclude the undertaking being commercially a success; and on other grounds it would be very undesirable to cut down any more of the indigenous forest, which already is reduced to such a small extent (*see map*).

With regard to the cultivation of other plants, I devoted as much of my time as possible to a careful review of the capabilities of the island, and append herewith the remarks I have to offer.

The plant known in the island as the English aloe (*Furcraea gigantea*) offers a very important means of establishing an industry by its extended cultivation, and the preparation of the valuable fibre which its leaves contain. This plant grows wild at mid-elevations, and its tall flowering stem, rising to the height of 30 feet or more, is quite a feature in the landscape. The leaves are often 8 or 10 feet in length; when freshly cut they possess a peculiar penetrating odour, from which the old name *Agave foetida* was derived. On the flowering stem, instead of flowers, there generally appears a numerous progeny of bulbils; these enable the plant to be very readily propagated. This *Furcraea*, which appears to have spread naturally on the low-lying lands and deserted sugar estates in Mauritius, has been utilized in that island for the production of a valuable fibre known in commerce as Mauritius hemp. A machine invented by M. Gracieux was found to extract the fibre from the *Furcraea* leaves successfully, and a large business, amounting to an annual export value of 15,000*l.*, has consequently been established there.

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Another machine, known as Smith's Patent Scutching Machine, manufactured by Messrs. Death and Ellwood of Leicester, is being used for the extraction of this fibre, and with favourable results.

Those who contemplate embarking in this industry in St. Helena should, in the first place, obtain one of the machines above mentioned, and test its suitability for the extraction of the fibre on the spot. The motive power might be obtained from horse-power, water-wheel, or windmill. For the circumstances of St. Helena the latter would probably be the most preferable. In the first place, the present supply of the *Furcraea* might be utilised; but sooner or later it would be necessary to establish regular plantations, in the immediate neighbourhood of works, and with proper appliances for the rapid transport of the leaves.

It must be remembered that the proportion of fibre in each leaf is very small. It is generally admitted that the leaves of this plant give an average yield of about 3 per cent.; that is to say, not three pounds of fibre for 100 pounds of leaves, but three pounds of fibre for 100 leaves. By actual experiment in Mauritius 50 leaves of average size, 4 feet long, weighing in the aggregate 56 pounds, produced 115 pounds of dry fibre. This would be at the rate of 3½ pounds of fibre per 100 leaves, or 3.12 pounds per 100 pounds.

A consideration of the above facts should lead to every effort being made to reduce the cost of transport of the leaves and to establishing works in a central position, easily accessible on all sides.

While in the island I received samples of fibre prepared by Mr. Deason of Longwood Farm, by means of a machine of his own invention, driven by windmill power. On arrival in England I was enabled, through the kind offices of Mr. Thomas Christy, F.L.S., to submit them for report to Messrs. Collyer & Co., Fenchurch Street, London.

The result is as follows: –

"Aloe fibre (*Furcraea gigantea*) St. Helena. Good length: full strength: rather dull colour: generally well cleaned, but with some runners untouched and barky. Value, 28*l.* to 30*l.* per ton. This sample is very different in appearance to the *Furcraea gigantea* of Mauritius, owing probably to differences both of growth and treatment. It is in some respects apparently more suitable for cordage purposes; that is, more like Manilla hemp."

Considering that this fibre was prepared by simply passing it once through the machine, that no water was used, and that it was dried by simply exposing it to the sun, the report is full of encouragement and very suggestive. Owing to the limited supply of water in the island it would be useless to attempt to

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wash the fibre, or indeed to do anything to it beyond drying it in the sun and beating some of the pithy substance out of it before it is packed for shipment.

To sum up my recommendations under this head, the chief points to which attention should be given: –

1. To grow large quantities of the plants and utilise all waste lands so as to produce leaves cheaply and economically.
2. To use simple and effective machines, the Gracieux or the Mauritius machine for preference, cheaply worked in the immediate neighbourhood of the plants.
3. To dry the fibre by exposure to the sun and air, and ship it in a perfectly dry condition.

*New Zealand Flax.* – New Zealand flax (*Phormium tenax*) has been extensively planted over the island, and in some cases it occupies good and valuable soil. Some time ago an attempt was made to establish a factory for the preparation of the valuable fibre yielded by this plant; and many people were thus tempted to cultivate it. As the factory with expensive machinery was established at Jamestown, several miles away from where the plants were grown, the expense of transport – chiefly by means of the small breed of island donkeys – was so great as to swallow up all the profits.

This cannot be a matter of surprise when it is remembered that it would take more than 100 tons of leaves, and these carried in small loads, to yield about five tons of fibre.

If another attempt is made to extract fibre from the New Zealand flax, the machinery should be placed quite close to the plants; and it might be more profitable in the end to ship a lower class of fibre than attempt to work expensive machines requiring a large water supply.

I am encouraged in this view by the report of Messrs. Collyer & Co., the brokers who examined the *Furcraea* fibre, on a sample of New Zealand flax, roughly prepared by Mr. Deason's machine. This was passed through the machine in the same manner as the *Furcraea* leaves, and submitted without washing or the use of chemicals. Messrs. Collyer's Report is as follows: –

"New Zealand flax (*Phormium tenax*) St. Helena.

"Fair length: fair strength: poor brownish colour: fairly clean: some runners untouched and barley. Value, 22*l.* to 23*l.* per ton.

"Either this fibre, or that of the aloe (*Furcraea gigantea*) would be fairly saleable in large quantities."

If Mr. Deason's machine does not fully answer for the New Zealand flax, possibly the machines manufactured by Messrs. Deane and Ellwood would do so. A single machine of their

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pattern may be had for about 37*l.* 10*s.*, and they are fitted with special appliances, so that they can be driven either by cattle or horses or by windmill power.

I commend the subject of the extraction of fibre from the New Zealand flax to the careful attention of proprietors in the island; and failing remunerative prices for the fibre, there is still an opening in shipping "half-stuff" for the paper manufacturers, and obtaining some return from the hundreds of tons of this material now growing uselessly on such extensive tracts in the island.

*Barbadoes Aloes.* – Another member of the aloe family, which is very abundant in the island, and capable of being largely utilised, is the Barbadoes aloe (*Aloe vulgaris*).

It grows freely in Jamestown Valley in volcanic ash, and on barren rocks. It is fast spreading also in Rupert's Valley; and I noticed it was there used, and seemed to flourish, as a coping for a stone wall.

This plant, so hardy and prolific, produces the aloes of medicine, and it is cultivated, especially at Barbadoes in the West Indies, solely for this purpose.

It reproduces itself by means of suckers around the stem; these being removed when about 6 inches high are planted out on waste pieces of land about 2 feet apart. When fully grown, and just before flowering, the outer and older leaves are first removed; they contain an abundance of a thick yellowish juice, which is allowed to drain into troughs leading into a large iron pot or cauldron. When the pot is nearly filled it is placed over a fire, and the juice boiled until it has attained the consistency of thick glue; this when cool is the aloes of commerce, and it is usually exported to England in bottles or gourds.

Barbadoes aloes, prepared in the manner above indicated, is valued in the London market at 4*l.* to 8*l.* per cwt. It is usually retailed by druggists at 4*s.* 6*d.* per pound.

This industry, which necessarily must be very small, might commend itself to the notice of many people, especially fishermen and others, living in the lower valleys. The plant is abundant; its cultivation, if merely putting a few suckers in the ground can be so called, is of the simplest description; and the preparation of the juice requires only a few troughs, made by nailing a couple of pieces of board at right angles to each other, and an iron pot. If some local tradesmen were to give attention to the subject, and undertake to purchase the manufactured aloes from the cultivators in small quantities, the industry would soon be placed upon a satisfactory footing.

*Walking Sticks, &c.* – noticed in many parts of the island that a considerable quantity of low brushwood, composed of privet (*Canthium* sp.), as well as numerous hedgerows of wild pepper (*Cluytia pulchella*), were spreading by means of root

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suckers over large areas. Also the European gorse or furze bush (*Ulex europaeus*), a naturalised plant in St. Helena, covered many acres of the somewhat barren slopes at mid-elevation. It occurred to me that possibly a small trade might be made in sending selected specimens of these to England for walking sticks, umbrella handles, &c.

With the view of testing the demand for such articles I brought with me a bundle of sticks, representative of the three plants above mentioned; and I had them submitted (through the Kew Museum) for examination by one of the largest firms in London interested in the subject.

The report which I received is as follows: –

REPORT by Messrs. H. Howell & Co., of 180, Old Street, City Road, London, upon sticks from St. Helena, collected by Mr. D. Morris.

"24th September, 1883.

"We have given attention to the specimens of sticks from St. Helena which you kindly sent for our inspection, and the result is that we find it difficult to speak as to their commercial value from such a *small sample*, as from a long experience we find that the larger the sample in sticks the more nearly it is likely to represent the bulk.

"Each of the specimens, however, have characteristics which we like, and if you could get over a large sample, say 500 or 1,000 each, or even, say, 200 each, we could then estimate their probable value in the market.

"The wild pepper should be sent over *without having* the root peeled. We prefer the roots left as large and natural as possible, so that we can use our discretion in shaping the handles. This remark applies equally to the privet.

"If the furze, too, can be cut with a knob or crook of some sort it will increase their value.

"These sticks, viz., the *two each* sent us, are all very fairly selected; that is, they are good sizes, and they taper nicely from the root to the point. Moreover, they are free from *knees* or *acute* angles, which always, when present, depreciate the value of sticks.

"The diameter of sticks such as these can vary from ½ inch to about 1 inch (yours measure ½ to ¾).

"HENRY HOWELL & Co."

*Pyrolusite*. – Pyrolusite, or black oxide of manganese, is occasionally found in veins amongst the finely crystalline felspathic greystone lavas at Horse Point; and, I believe, at one time an attempt was made to export it to Europe. The price obtained did not, however, encourage the hope of mak-

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ing it a permanent industry. The ore is of a particularly hard description, and difficult to separate from the clay beds in which it occurs. More than this, the cost of transport is so great that until some means can be obtained to ship it on the spot there is little hope of placing it in the market, so as to compete with supplies from other countries. [See Appendix I.]

*Clays*. – The numerous clays, ranging from bright red to pure white, found at the higher elevations, as they all contain iron, would be quite unfit for potter's purposes.

*Coffee*. – Coffee is grown in small patches varying from one fourth of an acre to two or three acres. At Plantation House, Terrace Knoll, Bambu Groove, Elliotts, Prospect, and Oaklands I saw very fine patches of coffee, somewhat neglected and unpruned it is true, but indicating the capabilities of the island to grow, in sheltered hollows, a fair quantity of very good coffee. The extent of land actually suitable for coffee would, however, be so small that I do not anticipate it will, under any circumstances, be produced in sufficient quantity for exportation. If it would supply local demands it would do a great deal.

It would appear that a large amount of foreign coffee is imported to the island, the returns for the last 10 years being as follows: –

| Year. | Quantity<br>(Bags). | Value. |
|-------|---------------------|--------|
| 1873  | 63                  | 311    |
| 1874  | 74                  | 433    |
| 1875  | 91                  | 431    |
| 1876  | 37                  | 171    |
| 1877  | 93                  | 473    |
| 1878  | 76                  | 222    |
| 1879  | 60                  | 251    |
| 1880  | 82                  | 348    |
| 1881  | 62                  | 237    |
| 1882  | 31                  | 121    |
| Total | 669                 | 2,998  |

For the improvement of this industry, which is in a very languishing condition, induced no doubt by the smallness of the individual areas and the inability to give proper scientific treatment to the trees, I have little advice of practical utility to offer. There should, however, be no difficulty in digging the ground around the trees, and applying, occasionally, a good dressing of manure to them. Also the pruning which the trees require is a simple matter in itself but it requires skill

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and intelligence above the average of that found amongst the small settlers.

The chief hope is, that if an intelligent gardener is appointed to take charge of the Crown lands and teach the people the elementary principles of cultivation, coffee will be included amongst the first objects to receive special attention.

*Tobacco.* – No tobacco is, at present, grown and prepared in the island. During the last 10 years 84,570 lbs. of tobacco were imported representing an aggregate value of 5,272/.

In 1869, at the suggestion of Sir Joseph Hooker, Sir Charles Elliott thought it desirable to encourage the cultivation of tobacco, if not for exportation, at least to supply ordinary demands in the island.

A small plantation was accordingly started by Mr. Chalmers, who gives the following account, in his report dated 12th December, 1871, "the ground was manured and the plants otherwise well attended to till they had arrived at that state of maturity at which it is customary to 'cure' or prepare the leaf for use. They were then carefully treated after the manner usually practised in tobacco growing countries. A sample was prepared and submitted through Sir Joseph Hooker to the test of a proficient London tobacconist, who reported upon it to the effect that it was deficient in flavour and burning properties, and bore evidence of having been grown on a very poor soil. Some of the leaves were, however, of fair quality, and he believed that by increased attention to the manuring of the soil, and the preparation of the leaf, St. Helena tobacco should become equal in quality to that of Natal and other tobacco growing countries."

The results of this experiment are exactly what might have been expected under the circumstances, and so far from discouraging the industry they afford very hopeful grounds for its ultimate success. There is no doubt that if Mr. Chalmers had remained in the island and carried on further experiments, tobacco culture would now have become an established industry. For good returns on a small acreage, tobacco growing is the most profitable of any. The chief points to be attended to are the selection of soil, and its thorough trenching and working, so as to reduce it to the finest powder. The soil should be a fine, somewhat sandy, rich loam, with no trace of clay or marl, and thoroughly well drained. No soil that I noticed in St. Helena is sufficiently rich at present to grow tobacco, and it would be useless to attempt to grow it where good facilities do not exist for heavily manuring the land. Where the soil possesses the characteristics mentioned above, a portion might be enclosed and cattle or sheep penned and fed upon it for several weeks. When the ground has become thoroughly saturated with animal deposits it should then be ploughed or trenched, and all the manure thoroughly mixed with the soil.

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Land so prepared would produce tobacco of the finest quality, and I trust that another attempt will be made to start an industry which possesses so many advantages for limited areas and a small labour supply.

*Forage plants.* – As raising and feeding cattle is one of the principal industries in the island, the question of raising large quantities of forage is a matter of prime importance. At present owing to the poor quality of the pasture lands, cattle require to be fed, especially in the winter months, with green forage, such as barley, oats, and Indian corn, supplemented by well cured hay made in the high lands. During periods of drought, such as those experienced during the last three or four years, several hundred cattle have died from want of proper nourishment; and at the time of my visit few, if any, island cattle were fit to be killed for food, the whole community being dependent on supplies from the Cape or the West Coast. Beef is usually retailed in Jamestown at 1s. 1d. to 1s. 3d. per pound.

The improvement of the grass lands and a larger and more abundant supply of forage appear to me to be the urgent wants of the island.

As regards the grass lands, they have all, for the most part, become impoverished by continued and ceaseless cropping and the entire absence of manuring.

To improve them, the hundreds of tons of manure wasted in Jamestown should, by some means, be made available for the purpose; or, failing this, farmers should look upon a compost or manure heap, formed by all refuse and vegetable *debris* near and around farm buildings and cottages, as a necessity in order to enrich the lands in their neighbourhood and develop their resources. In some few cases where this is done the results are so patent that they should commend themselves to the serious attention of all in possession of pasture lands.

For green forage possibly barley, Cape oats, and maize or Indian corn are very suitable for the soil and climate, and yield large quantities of useful and nutritious forage. To supplement these, I would recommend the introduction and cultivation of several varieties of Sorghum, usually called millet or guinea corn. In the south of Europe, in Asia Minor, and more recently in the United States of America, the cultivation of Sorghum occupies a place similar to that which oats and barley hold in the field-culture of the northern parts of Europe; and its extended culture in St. Helena would, I believe, be attended with very satisfactory results as a forage plant.

I was much struck by the almost entire neglect of the celebrated guinea grass (*Panicum .jumentorum*) in St. Helena. Speaking of the importance of this grass in Jamaica (Report 1880, p. 23), I mentioned that "most of the grazing and breed-

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ing pens were originally created and are still supported by means of this invaluable herbage, and perhaps the settlement of the north side of the island is wholly due to the introduction of this excellent grass. Again, it has rendered many rocky and otherwise barren spots in Jamaica very valuable as affording support to herds of cattle and horses."

To establish this grass in St. Helena the land should first be ploughed and manured. The grass-tufts taken from an older field should be planted about a foot or 18 inches apart each way and well fixed in the soil. If seeds are used they may be sown broad-cast, or in drills. A large field of guinea grass in a sheltered spot at mid-elevation would be more productive than almost any forage plant. To keep it in good order the grass should be cut not grazed, and the field should receive periodical hoeing and a plentiful supply of manure.

To guard against drought and times of scarcity of water it would be very desirable to introduce several valuable trees, yielding nutritious pods or fruits, which in many countries possessing dry and arid climates supply the chief food stock for cattle and horses.

Among the first of these I would place the Carob tree (*Ceratonia siliqua*), a native of the countries bordering the Mediterranean, where it is extensively cultivated for the sake of its pods. These contain a large quantity of agreeably flavoured mucilaginous and saccharine matter commonly employed for feeding horses, mules, pigs, &c., and occasionally, in times of scarcity, for human food.

The tree can resist great drought, as its long roots penetrate to a great depth in search of water. I found one small plant of this tree at Oakbank; but as it is not likely to flower for many years it would be better to

import large quantities of seed from the south of Europe, and establish the tree everywhere in the island below 1,200 or 1,500 feet.

Another useful tree of this class is the Rain tree (*Pithecolobium Saman*) of South America. Its pods, produced in large quantities, are greedily devoured by cattle, and for the lower lands and the valleys of Jamestown and Rupert's Valley it would prove a handsome shade and shelter tree, as well as a useful forage plant.

The Cashaw (*Prosopis juliflora*) is found invaluable in the West Indies in time of drought, and being a hardy tree and easily propagated it should be utilised largely in St. Helena. The pods of this tree possess the nutritious properties of the Carob, to which indeed it is nearly allied; but they require to be gathered soon after they have fallen, and kept in a dry place as, after they have begun to germinate, they are highly injurious to cattle.

St. Helena possesses three grasses which are peculiar to it, as I learn from Mr. Hemsley. They are: *Agrostis simulans*,

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Hemsl., *Eragrostis saxatilis*, Hemsl., *Demazeria oblitera*, Hemsl. The former was abundant in pastures in the interior of the island, and was also collected by Sir Joseph Hooker and Mr. Melliss; the other two are probably unimportant as forage grasses.

These are the only native grasses in St. Helena, if we except the doubtful existence at the earliest times of the Bahama or Bermuda grass (*Cynodon Dactylon*). The paucity of species would probably be due to the fact that at one time the island was covered with thick forest with no open spaces suitable for grass. Be that as it may, it is evident that it is very desirable to supplement the present forage resources of the island; and this can only be done by a more scientific and generous treatment of the grasses now in the island, and the introduction of the valuable trees mentioned above.

*Oranges, Limes, Citrons, and Lemons.* – Of this class of fruits St. Helena is practically destitute. It is true that a few orange trees grow in Jamestown; and, occasionally, a few limes and lemons are produced in Rupert's Valley. But any of these fruits produced in the island are looked upon as local curiosities, and as much as a shilling each is asked for them.

Mr. Melliss, speaking of the lemon, remarks: – "Formerly the island was quite a lemon garden, producing fruit in perfection, but now visitors and mariners after long sea voyages look for them in vain. The trees growing old, their roots penetrated through the upper soil to the rock, and no new ones were planted, so that about 10 years ago lemons became a scarce article. The tree once grew plentifully in such places as Lemon Valley, Lemon Tree Gut, &c., where now scarcely a vestige of one is to be seen."

Speaking of the lime, Mr. Melliss relates the same story, and adds: – "The lime, once so abundant, suffered the same fate as the lemon, and I doubt if a lime can now be obtained in the island."

The sweet orange fruits fairly well, but the number of trees is so small that practically the fruit is little known, except as imported from other countries.

The shaddock or pumelow is found in one or two gardens, and appears to produce fine fruit. The citron is represented by one solitary tree in Rupert's Valley.

Most of the Citrus tribe are severely attacked by an *Aphis*, with the subsequent visitation of a *Capnodium* or sooty blight, similar to that which so ruinously attacked the orange trees at Madeira and the Canary Islands. There is also another enemy, possibly a small fly, which produces a knotted, crumpled appearance of the leaves, often attacking the entire foliage of a large tree.

These insect and fungoid blights are no doubt the cause of much of the failure of orange and lemon trees in St. Helena,

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but they are evidently not answerable for the whole of it. In former times great care was taken with the trees, and they were established under conditions very different to the present. As the old trees died no fresh ones were planted; or, if they were planted, they were not properly supplied with large, deep holes, free from stone and rubble, or with the necessary manure and good dressing.

I believe with proper precautions and management all the members of the Citrus tribe could be grown to a much larger extent than at present. The blights could be kept in check, and if the trees had only a tithe of the manure wasted in their immediate neighbourhood in Jamestown, they would soon bear abundant crops.

Under this head, as well as in the culture of the finer vegetables, great assistance might be rendered by a well-trained practical gardener accustomed to the management of tropical plants. A large supply of grafted plants of all kinds requires to be placed within reach of the people, and they also require to be shown experimentally the results of scientific and careful culture.

*Grape Vine.* – Owing to the introduction of an insect from the Cape during the last 10 years the grape vines in St. Helena have been almost entirely destroyed. The exact nature and habits of the insect should be investigated, and specimens should be sent to England for the purpose. On all sides I heard lamentations over the loss of grape vines which had grown splendid grapes for nearly half a century. To resuscitate vine culture fresh kinds, and especially hardy American vines, should be introduced. It is quite possible that the worst attacks of the grape insect are over, and under these circumstances the culture might be resumed.

*The Peaches* have suffered equally with the grape vine from the ravages of insects during the last few years; and at present the fruit, once so common, is becoming rather rare. The apricot is present, but does not bear.

*The Loquat* is a plentiful and highly esteemed fruit.

*The Date Palm* grows well and bears abundantly in Jamestown Valley. One kind, called Bussorah date, without a hard kernel, is particularly good.

Of other fruits produced in the island there are guavas, the common red and pear-shaped; the mango, a few trees only; the tamarind, two or three trees of an inferior kind; the rose-apple, a few trees; the pomegranate, plentiful and good; the granadilla and sweet-cup, rare; the papaw, a few plants only; the fig, fairly common; the mulberry, common; the avocado pear, rare; the Cape gooseberry, common; the raspberry and blackberry, common; the cherimoyer, a fine and delicious fruit, rather common; the strawberry, rare; the

the Otaheite gooseberry (*Cicca disticha*), rare; the Chinese gooseberry (*Averrhoa Carambola*), rare; Kei apple (*Aberia Caffra*), somewhat common; the country walnut (*Aleurites triloba*), rare; the prickly pear, abundant; the Indian almond (*Terminalia Catappa*), common; the sea-side grape (*Coccoloba uvifera*), rare; and the Barbadoes gooseberry (*Pereskia Bleo*), rare.

*Pineapples.* – It would appear that pineapples, the finest of tropical fruits, are only moderately successful in St. Helena. They are probably cultivated at too great an elevation, and in soil of too clayey a character.

Pineapples prefer a fine, light, sandy soil, thoroughly well drained. No animal manure should be applied to them, but the rich, black earth from the forest, or what is known in England as fibrous loam, is the best dressing for them.

New varieties should be introduced to the island; and, with proper treatment, the Jamestown Valley might raise pineapples of the finest kinds.

I append here some remarks on pineapples, from one of my reports: –

"The soil should be a fine, gravelly loam, free from clay, and perfectly drained. The plants, consisting of suckers from older plants, may be put out at about 3½ feet apart, care being taken to keep them free from weeds, and give the land, in dry weather, a dressing of decayed leaf-mould or rotten turf; animal manure, unless very old and, in fact, reduced to black earth, is not suitable for pineapples, and should be carefully avoided.

"In rather moist lands pines may be planted in ridges with drains between, but in hot, dry soils, after a preparatory trenching of the whole surface, pines may be planted on level land.

"The best kinds to cultivate for export are the Black Antigua, Black Jamaica or Cow boy, Ripley, Charlotte Rothschild, Smooth Cayenne, Scarlet or Cuban Pine, and British Queen."

*Tea.* – There are one or two tea plants in the island, but they are so poor and miserable that, judging from their age and appearance, tea is not likely to be successfully cultivated in St. Helena.

*Roccella tinctoria.* – This lichen or dye-weed, known as orchella weed or orchil, is very common on the exposed rocks of High Knoll, Ladder Hill, Rupert's Hill, and Sugar Loaf. It is an article of commerce in Ceylon and India, and much esteemed in England as affording a fine blue or purplish dye. If, on investigation, it is abundant in other parts of the island, it might be usefully collected and form an article of export.

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*Vanilla.* – This valuable spice plant is being tried on a small scale, but the results so far are not satisfactory, owing chiefly to a want of knowledge of the requirements of the plant, and the proper methods for artificially fertilizing the flowers. The plants require warm *and well sheltered situations*, very moist, rich soil, and plenty of shade.

Vanilla is a valuable spice, which in some countries, as in the Isle of Bourbon, where it has been successfully introduced and cultivated, forms a valuable article of export. Well-cured vanilla-pods fetch as much as 30s. per

pound. The following directions for establishing vanilla from cuttings, and curing the pods, have been lately published by the Botanical Department, Jamaica, and I quote them as applicable in every respect to the circumstances of St. Helena.

"*Vanilla*. – This is a vigorous soft-stemmed plant, the cured fruits of which are the valuable vanilla beans of commerce. If cuttings are taken, their upper end or the portion to appear above ground may be readily determined by examination of the base of the attached leaf, in the aril or upper face of which is a small growth bud.

"Cut the stem with, say, three or four joints, at one-fourth of an inch below the basal node or joint, then place the base of each cutting shallowly in prepared soil, against the bole or trunk of a rough-barked, low branching tree, as, for instance, calabash; or on a low-trellised frame 3 to 4 feet high, the supports of which should be unbarked logwood, yoke or calabash.

"If the insect which fertilises the flowers of this orchid, in its natural habitat, is not present, in order to secure a crop of fruit it is necessary that the flowers should be artificially fertilised. This may be easily accomplished as follows:

"In the flower is a central white column, at the summit of which is a detachable cap or anther, which if touched on the lower front edge with a sharpened pencil or knife blade will adhere to the implement. The pollen masses contained in the anther must then be made to lightly touch the viscous (sticky) disc situated on the front of the column. Each flower must be so treated at or about noon of the day on which it opens.

"To cure vanilla beans gather when full; steep for about two minutes in boiling water and place in flannel to dry in the sun. When perfectly dry place them next day on plates of iron or tin, anointing once or twice with sweet oil, to keep them soft and plump. Complete the curing process by exposing them carefully in the sun for several days. When quite cured they should have a uniformly rich brown colour, and the full fragrance of this valuable product."

*Olives*. – Fine trees of the true olive *Olea europaea* grow in the neighbourhood of the Briars (the residence of the Honourable George Moss), and at certain times they are loaded with fruit. Extensive areas at similar elevation might be placed

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under cultivation in olives which are admirably adapted to the circumstances of the island. The best varieties of olives are grafted, and if a few plants of the finest and largest Spanish olives were introduced, grafts from these might be established on seedlings raised in the island. I have no doubt that green olives of fine quality might be grown in St. Helena, and from the present trees as they stand large quantities of oil might be prepared.

For further information respecting the cultivation I am indebted to Mr. W.T. Thiselton Dyer, C.M.G., for the following extract from an article on The Vine and Olive in Siena," in the Journal of the Society of Arts for October 19, 1883, pp. 1005-6.

"The olive is cultivated on the hills. In some places it is grown in plantations, and in others the trees are generally planted in rows along the fields, in combination with other cultures. The varieties most generally grown are the *correggiolo*, the *moraio* which ripens early, and the *olivastro*. The trees are grown from slips

cut in the spring, which are planted in holes in ground that has been well broken up and covered with mould, and watered as required. The hardiest shoot is subsequently selected and may be permanently planted in three years. The olive is also raised from seed. In the districts of Siena, when a tree is about to be cut down, the *uovali*, or eyes, on the roots are detached, and placed in a separate plot of ground, plants being obtained from them in three years, which can then be transplanted. In the wooded districts where the wild olive is plentiful, grafting is commonly employed. The trees are usually planted in holes or ditches of more than two yards square, and a yard deep, drained with a layer of stones. When the olives are planted in rows in the fields, they are generally pruned a *paneira*, nearly all the inner branches being cut away from the centre to enable air and light to penetrate freely. The trees are pruned every two or three years. The most careful cultivators apply a special manure when the trees are between five and eight years old, composed of straw mixed with woollen rags, the whole saturated and moistened with sewage, but this is not general, as the trees profit by the manure laid on the fields. It is estimated that in the Province of Siena, one acre of vines will produce 115 gallons of wine, and an acre of olives, 20 gallons of oil; the quantity of the former actually produced in 1882 amounting to 10,898,000 gallons, and of the latter 780,000 gallons."

*Cork.* – The cork oak grows so freely near Plantation, at Oak-bank, Terrace Knoll, and other places that it may be said to be naturalised in the island. The bark, so far as I am aware, has never been utilised or its value tested in the English market. If the seed, produced so abundantly, were sown on waste banks and ridges, the timber at least would be very valuable, and an

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opportunity would be offered for placing the cork in the market for experimental trial.

*Flower Cultivation for extracting Perfume.* – The luxuriant manner in which many garden plants, such as *Gardenia* and others, flourish in the island has suggested the possibility of cultivating them for the sake of extracting their perfume. The difficulty hitherto has been to obtain a simple and inexpensive apparatus, by means of which the perfume can be extracted. From inquiries made, after my return to London, I believe, provided a sufficient quantity of flowers can be obtained, an apparatus designed and supplied by the firm of Eugene Rimmel would fully answer the purpose.

*Arrowroot.* – The cultivation of the arrowroot plant (*Maranta arundinacea*) should be largely undertaken, as it would flourish in most gardens with very little care or attention. Arrowroot is a pure nutritious starch obtained from the roots of the plants when about 12 months' old. The starch is extracted from the tubers, by reducing them to a pulp in water, straining, allowing the fecula or meal to subside, again washing it, and ultimately allowing it to dry.

*Turmeric.* – This is a medicinal and tinctorial substance obtained from the root of *Curcuma longa*, an East Indian plant belonging to the same family as ginger. The powdered root forms one of the ingredients in the preparation of Indian curry-stuff or curry powder, to which it imparts its yellowish hue. This plant might be cultivated under similar circumstances to arrowroot; and if not already in the island – a plant of it was supposed to be at Oakbank, but I failed to find it – it might be obtained through the Royal Gardens, Kew.

*Oil Plants.* – Among the numerous class of oil plants for which the island is adapted mention might be made of the gingelly-oil plant (*Sesamum orientate*), which is already cultivated to a small extent among the settlers; pindar-nuts (*Arachis hypogoea*), a productive plant in light sandy soils; croton-oil tree (*Croton Tiglium*), a common East India plant; castor-oil plant (*Ricinus communis*), already a common weed near cultivated areas; physic nut (*Jatropha Curcas*), which yields a valuable medicinal oil; the African oil-palm (*Elaeis*

*guineensis*); the butter tree (*Bassia butyracea*), a native of Bengal; and the horse-radish tree, or oil of Ben tree (*Moringa pterygosperma*), a very free-growing and hardy tree, common in the West Indies.

*Bird Pepper*, which is the source of the Cayenne pepper of commerce, should be cultivated in dry, hot neighbourhoods, especially in Jamestown and Rupert's Valley. It is a cultivation suitable for elderly people, and those unable to undertake much bodily fatigue; but if the pepper is prepared carefully and successfully there is a very fair demand for it at good prices.

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*Bananas*. – This fine tropical fruit is grown to a small extent, but owing to the destructive influences of wind they do not bear so abundantly as they should. The small Chinese banana (*Musa Cavendishii*) is admirably adapted for cultivation in St. Helena, but with the exception of one or two plants it does not appear to have been largely tried. Being a small plant, seldom more than 5 to 6 feet high, it would grow well under shelter of a wall or side of a house; and under these circumstances it would be more satisfactory to grow than the taller kinds.

*Plantains*. – This highly esteemed vegetable rather than fruit appears to be absent in St. Helena. At least no plants came under my notice. As a food plant it stands high in most tropical countries, and is very easy of cultivation. Suckers might no doubt be obtained from the West Coast of Africa in large quantities. It would require shelter, and a moist and somewhat rich soil. The latter conditions are easily attained in Jamestown, at least, by means of irrigation.

*Vegetables*. – Of ordinary table vegetables there is a fair supply. Potatoes, cabbages of good quality, pumpkins in five or six varieties, onions, shallots, beans, peas, cucumbers, parsnips, carrots, beetroot, chillies, are all grown more or less, and flourish best in sheltered spots at mid-elevation.

What is called in St. Helena Yam (*Colocasia esculenta*), to be distinguished from the "Yam Flower" (*Richardia*), is only slightly cultivated, whereas the "Coast Yam" (*Dioscorea*) has almost entirely disappeared.

For the shipping, lettuce, radish, and water-cress appear to be receiving chief attention.

The Cassava plant (*Manihot utilissima*) is not present, although its cultivation might be attended with great success.

The Chiote or Chocho, the Pepinella of Madeira (*Sechium edule*), is a hardy vegetable, somewhat resembling the vegetable marrow, which should certainly be introduced to St. Helena. In the West Indies it is reckoned extremely wholesome, and is commonly used as an article of food by all classes. The plant is propagated by seed, and when once established becomes a hardy self-sown climber, bearing nearly all the year round a fruit larger than a pear covered with soft prickles. It is boiled (or parboiled and fried), and eaten as a vegetable.

I noticed that pumpkins, vegetable marrows, cucumbers, melons, and all plants of this class were severely attacked by a fungus (*Erysiphe*) which covered them with a whitish floury deposit as if they had been powdered over with lime dust. This or a very closely allied disease also attacks peas, cabbages, roses, and other plants. The best treatment for this disease is the application of flowers of sulphur dusted over the plants immediately it appears.

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Where the disease has taken firm hold of plants in a garden, the better plan is to burn them at once, and so destroy the spores, which would otherwise remain in the land and attack the plants of the next season.

Pumpkins, vegetable marrows, and melons should never be planted in old garden soil. These plants require freshly broken ground away from other cultivation, but it is not necessary that the land should be very rich or heavily manured. It is said that too rich a soil has a tendency to produce a large proportion of male – and hence barren flowers.

A native vegetable much resembling celery is found growing wild on Diana's Peak, which formerly was sold and eagerly bought in the market at Jamestown. This is the Angelica (*Sium Helenium*, Hook. f.), a handsome umbelliferous plant, growing to the height of six or eight feet amongst the cabbage trees and ferns on the central ridge.

The inner portions of the stem, which is of a tender succulent character, may be eaten raw, and form an excellent substitute for celery. The native people eagerly eat it. As brought to market it is in short tubes, much like bamboo stems, and is sold under the name of jelico.

A plant growing in one of the economic houses at the Royal Gardens, Kew, shows that it might be easily cultivated if necessary.

*Potatoes.* – This is probably the staple production of the fanners and small cultivators in St. Helena, and if there were a convenient and abundant market, potato-raising might become the source of a considerable export trade.

Some time ago St. Helena potatoes were exported to the Cape and found great favour there. Owing, however, to the restrictions attending the introduction of the phylloxera. all vegetable produce, and even potatoes, are placed under a ban, so that the trade from St. Helena is hopelessly cut off. Potatoes are sold in fair quantities to the shipping and to supply local demands, but there is no incentive to grow such large quantities as the island could produce, as cultivators have often seriously lost thereby.

The potato disease (*Peronospora*), so well known in England, is at times very severe on lands at the higher elevations, but if the soil were more kindly treated and new stock introduced from England from time to time, this disease would not probably be severely felt.

I was informed that as many as three crops per annum of potatoes have been off the same land; as the use of manure is the exception and not the rule, and as some soils have been under continuous cultivation for the last two hundred years, it speaks well for the inherent quality of St. Helena soils that

they are still yielding large, and where properly treated, abundant crops.

*Hops.* – While on a visit to Mulberry Gut, in the neighbourhood of Longwood, it occurred to me that in such sheltered, rich hollows as this, hops might be cultivated with success. I discussed the subject with many of the cultivators, and the impression was that hops would do well in St. Helena. Plants might be obtained either

from England or America. The cultivation, like tobacco, inasmuch as it yields a large return on a small acreage, is well worthy of attention.

*Cotton.* – A fine sample of St. Helena cotton was presented to me by Mr. Benjamin Grant, which attracted considerable attention at home. The sample has since been deposited in the Museum of the Royal Gardens, Kew. At present prices, I fear St. Helena cannot grow cotton to compete with, other countries, but the subject should not be lost sight of in case the plants, growing almost wild, can be utilized.

*Cocoa-nuts.* – Only a few cocoa-nut palms grow in the island, and these chiefly in the Jamestown Valley. Owing to there being no sandy beach, or any sandy hills or banks, along the coast of St. Helena, the cocoa-nut palm is unable to obtain the conditions so essential to it. Few, if any, of the plants are in bearing, and owing to the dry, gravelly, and poor quality of the soil, the stems are slender and weak, lacking the robust, luxuriant habit so marked in the West Indies, and evidently showing it is not at home here. I would recommend a more generous treatment of the plants; plenty of manure being forked in among the roots, and an occasional application of salt water or of the brine out of pickled beef or pork barrels.

*Sugar Cane.* – A few plants of the ordinary varieties of sugar cane are found in Jamestown, but no attempt is made to cultivate them. For eating purposes many of the newer varieties might be introduced, as also for the purposes of fodder for horses and cattle.

*Indian Corn or Maize.* – This is cultivated to be cut as a forage plant in the green state, but is seldom grown as an article of food. To many people in countries where maize, either in the green state (cobs), or as meal, enters largely as an article of daily food, it would be a matter of surprise to find that it is hardly known here. Owing to custom and habit the people in St. Helena consume large quantities of rice; in fact, as long as a St. Helenian can procure a little rice to go with his fish he is quite happy. There is no doubt if maize could be substituted for rice as the staple food of the bulk of the inhabitants of St. Helena the island could easily dispense with the present large importations of rice, and possess within their own resources the chief food supply of the inhabitants. The taste for rice has arisen from the former close connexion of

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the island with India, and the facilities which then existed for obtaining it by means of homeward bound ships. In case of war and the blockade of the island for any length of time, rice would be practically cut off, but maize if grown locally would be at hand and provide a good food supply for an indefinite period. Both on these grounds and the great adaptability of the soil for growing maize, when it cannot possibly grow a bushel of rice, it might be advantageous to do something to encourage the cultivation of maize in St. Helena, and so bring it prominently before the people.

At the present time oats and maize are imported from the Cape and America for feeding horses, whereas the latter at least might be produced locally in large quantities.

*Fisheries.* – Fish of all kinds abound in the neighbourhood of St. Helena, and are easily caught. A large industry might be established in fish curing for exportation if sufficient enterprise were created amongst the inhabitants, and this wonderful resource of so isolated an island rendered conducive to its wealth and prosperity.

The American whalers obtain large supplies of oil within easy reach of St. Helena, while cod and mackerel might be caught in large quantities.

The chief food fishes found in the neighbourhood of St. Helena are: – Gurnard, eel, cod, mackerel, tunny or albacore, bullseye, cavalley, flounder, hog-fish, mullet, skulpin; crustaceans, such as stump and crayfish; and the green turtle. The boats and appliances now in use are too small for deep sea fishing, and on this account chiefly many very valuable fish found on the windward side of the island are seldom caught.

*Bee Culture.* – The honey bee was, I believe, at one time introduced to the island, and it became quite naturalised. According to Melliss "it almost suddenly disappeared about 18 or 20 years since."

As there are so many flowers constantly in bloom, and all the conditions exist for profitable bee farming, I would recommend that bee farming as a regular industry be introduced and encouraged. The export of beeswax and honey from Jamaica, an industry chiefly in the hands of negro settlers, amounts to the annual value of 8,000*l.* per annum.

The Pride of India (*Melia Azedarach*), an Indian tree, now widely distributed all over the world, is one of the commonest objects in the island. About Christmas time it is covered with masses of blue-coloured, sweet-scented blossoms. These are generally succeeded by immense quantities of small spherical yellow-coloured fruits, generally considered to possess poisonous qualities.

Although the root is bitter and nauseous and used in North America as an anthelmintic, the tree practically is of little

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economic value. It must be distinguished from *Melia Azadirachta*, the Neem tree or Margosa, which is a very valuable plant. From the latter a kind of toddy is obtained by tapping; and from the fruit an oil is extracted fit for burning and other domestic purposes.

The Peepul trees of Jamestown (*Ficus religiosa*) are remarkable for their great age and the peculiar contorted and weather-beaten appearance which they have assumed. These trees afford grateful shade in the streets of Jamestown; and it is much to be desired that more of these and other trees be planted on all sides to relieve the monotony of the purplish lava hue which pervades streets, houses, rocks, and everything.

The graveyards and waste lands between the houses and the steep cliffs of lava on both sides of Jamestown Valley might be rendered ornamental and even picturesque if planted with hardy trees and shrubs. The Peepul, two or three other species of *Ficus*, especially the India-rubber tree (*F. elastica*), the Indian almond (*Terminalia Catappa*), the Caffre date (*Harpephyllum, caffrum*), and numerous ornamental aloes would grow admirably in such situations.

The present governor has done a little in this way already, and it is with the view of strengthening his hands in so laudable a work that I draw attention to the subject in this report.

The Caffre date might be largely utilized also to relieve the monotony of the dreary waste at Half-Tree Hollow and Dallas Village, as well as generally on exposed barren spots in the neighbourhood of dwellings.

Amongst the plants of interest in the island I may mention a remarkably fine specimen of the Chili palm (*Jubaea spectabilis*), erroneously called the double coco nut (*Lodoicea sechellarum*) in the local hand-book published by Mr. Grant. This plant grows at Farm Lodge, and attains a height of about 40 feet. The stem at the

base measures about 5 feet in circumference, and is crowned at the top with almost a globular mass of fine long pinnated fronds, somewhat resembling the date palm, but, if possible, with a more pronounced glaucous tint.

This palm fruits freely, the nuts being small and spherical, having much the characteristics of miniature coco nuts. Owing to the eagerness with which they are sought, for the sake of the white edible kernel, they appear to have never been sown. At least it is remarkable that, although the palm is well known and a very striking object in the country, not a single plant has been raised from it during the numerous years it has continued to produce seed.

The seed work acacia (*Piptadenia peregrina*, BTH.), is utilised for ornamental purposes. Its seeds are gathered, dyed black means of copperas, and made into bracelets, brooches, and other ornaments.

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The Cape Yew (*Podocarpus elongata*) is one of the handsomest and most successful timber trees in the island. It produces an abundance of seed, which grows freely in all places around the parent trees.

*Bamboos* in several varieties are established in the island. The handsome *Dendrocalamus giganteus* grows to a large size at Oakbank, where I had the pleasure of finding it in flower.

Sea Bean (*Entada scandens*). I saw several of these large beans which had been washed ashore on the windward side of the island. As the plant is not found at the Cape, it is probable that these seeds had been brought by sea currents all the way from the West Indies or the West Coast of Africa. It is said that these sea waifs have germinated in St. Helena and produced one or two fine plants. At present, however, I believe there is no plant existing.

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## APPENDIX I.

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Owen's College, Manchester,

MY LORD,

November 16, 1883.

I HAVE the honour to reply to the letter of Sir Robert Herbert's of November 7th, with reference to samples of pyrolusite collected by Mr. Morris in St. Helena, requesting report and analyses.

*Sample 1.* (St. Helena manganese, soft, found in clay beds.)

Percentage of manganese dioxide, 35.41.

*Sample 2.* (St. Helena manganese, hard, found in clinker.)

Percentage of manganese dioxide, 63.19.

The value of manganese ore at the present moment is 70s. (£3 10s.) per ton, delivered at Liverpool or Garston, for an ore containing 70 per cent. of manganese dioxide. For poorer ores a deduction of 2s. 6d. for every degree or percentage is made. It thus appears that the material No. 1 is worthless, whilst No. 2 would be worth 52s. 6d. per ton delivered.

Manufacturers of chlorine, the chief employers of this ore, rarely buy any manganese so low as 63 per cent.  
Your Lordship will therefore see that should the cost of getting and transport amount to anything approaching the figures given by Mr. Morris, any economic use of the St. Helena pyrolusite is out of the question.

I have, &c.,  
H.E. ROSCOE.

To the Earl of Derby,  
Colonial Office.

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## APPENDIX II.

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### REPORT ON THREE SAMPLES of EARTHS from ST. HELENA submitted to me for Chemical Analysis.

THE three samples submitted to me were numbered I., II., and III., respectively.

No. I. This is a specimen of fibrous aragonite or carbonate of lime, containing 92 per cent. of carbonate of lime, 1.1 per cent. moisture; 3.50 per cent. silica, and 2.3 per cent. alumina. This, when burnt in kilos, would form quicklime, which, when slaked, is very useful for field purposes, and increases the production of crops in a high degree.

Nos. II. and III. are both specimens of gypsum, the former containing 20.62 per cent. water and 79.38 per cent. sulphate of lime, and the latter 21.3 per cent. water and the rest sulphate of lime, they are therefore pure minerals. Quicklime cannot be obtained from this by burning, but it can be used directly as manure in the fields, and is very useful when judiciously employed.

B.H.J HOOKER.

Royal School of Mines,  
South Kensington, S.W.