

HORTICULTURE IN THE TROPICS.*

CEYLON is noted for its tropical luxuriance, and one gets the first impressions of this in its capital of Colombo with its masses of green foliage and the variegated colours of numbers of flowering plants to be seen everywhere.

The Victoria Park is well worth a visit for the many interesting plants which it contains, among them, large Cinnamon trees, a giant *Eucalyptus albus* with conspicuous white bark, the endemic *Sterculia Thwaitesii* with large buttress stems, *Casuarina equisetifolia* 70 feet or more high with switchlike branches, and, hanging like a huge curtain from the branches of the Wild Olive, the largest plant of *Vanula planifolia* I saw during my travels. Clothing the stems of *Terminalia glabra* was the epiphytic *Scindapsus aureus*, reaching 30 feet in height, and a lovely plant it is seen in this way. Climbers such as Bignonias, Allamandas, Bougainvillaeas, and the beautiful *Antigonon leptopus* in its pink and white forms are used here, as elsewhere in Colombo, for their rich colour effects which in the tropical sunshine are very brilliant.

In many of the charming bungalow gardens about Colombo, *Spathoglottis (aurea)* and *S. plicata* are used for bedding much as we use Pelargoniums at home, and they give royal feasts of colour, as do *Vinca rosea* and its variety *alba*.

Owing to its different elevations Ceylon has varying temperatures and climate which make it possible to grow a wide range of crops. At Colombo the mean temperature for January is 79°, and for April 82½°, while at Nuwara Eliya at 6,188 feet elevation, where the thermometer sometimes falls below freezing point, the average temperature is 58°. In the large planting districts, Dimbula, Dikoya, Maskeliya, and Uva the average is 65° all the year round.

The rainfall varies from 37 inches at Hambantota to over 200 inches on the Adam's Peak range, while in Colombo it is 88 inches.

Ceylon has an area available for cultivation (excluding lakes and backwaters) of some 12,000,000 acres, and at the present time about 4 millions are under cultivation or used for pasturage, the areas devoted to the chief crops being, in acres: rice 610,000, other food grasses 120,000, coconuts 750,000, areca, palmyra and ~~and~~ palms 140,000, tea 398,00, rubber 184,000, cinnamon 45,000, cardamoms 9,000, other spices 10,000, sugar 20,000, cacao 36,000, fruit-bearing trees 250,000, tobacco 25,000, essential oils 40,000, other cultivated grasses 15,000, vegetable and garden produce 350,000, natural pasturage 1,000,000 (about).

From Colombo a visit was made to Mount Lavinia, formerly the residence of the Governor, but now a health resort, surrounded by coconut groves. Several pretty Sinhalese villages are passed on the way, and one may gain some idea of the beauty of the country and its dignified inhabitants.

From Colombo I went to Kandy, the mountain capital of Ceylon, from which the famous gardens of Peradeniya are four miles distant. By train the journey takes four hours and is most attractive owing to the constant change of scene from the low country to the mountain zone of the Central Province. For some distance the train runs through flat rice fields, which

* Part of a paper by W. Hales, A.L.S., in *The Journal of the Royal Horticultural Society*, Vol. 53, part 2, July 1928.

alternate with gentle knolls on which stand the residences of the native cultivators surrounded by groves of plantains, jak fruits, bending coconut palms contrasting gracefully with the straight and slim arecanut and the elegant sugar palm, while here and there an occasional glimpse is caught of the talipot palm, one of the most noble objects in the vegetable kingdom.

The sugar-loaf top of Adam's Peak soon comes into the view rising to a height of 7,352 feet above sea level, being the fifth highest peak in Ceylon, and not long afterwards the double-headed Allagalla mountain also shows itself, and, the real climb having now commenced, a second engine is attached to the train, which, owing to the ascent being now 1 foot in 45 feet with curves round the mountain side of some 600 feet, proceeds at the slow rate of about 12 miles an hour. This, however, has its compensations, since you are able to note the exquisite mountain, valley, woodland, and homestead scenery, with the view into the famous Kandy Pass 1000 feet below. Conspicuous also in the Dekanda Valley are the terraced rice fields and the silvery foliage of the Kekuna tree, *Canarium zeylanicum*, while the purple flower spikes of *Lagerstroemia* attract attention. On the hill-sides large rubber plantations are interspersed with delightful natural scenery down which waterfalls tumble and glisten in the bright sunshine, and give a refreshing cooling effect.

Finally, after crossing a bridge which spans the Mahaweli-ganga, New Peradeniya station is reached, and, leaving the train, you are in a short time within the Royal Botanic Gardens, Peradeniya. These famous gardens were opened in 1821—six years after the fall of the Kandyan kingdom—and are part of land which belonged to a royal demesne. They are 146 acres in extent, are ideally situated on undulating ground in a loop of the Mahaweli-ganga, with the shadow of the Hantane mountain rising 4,100 feet in the near distance, and have much natural beauty, added to by the excellent landscape work of its several distinguished directors—*Thwaites*, *Trimen*, *Willis*, now being continued under the Hon. *F. A. Stockdale*.

Part of the early work of Peradeniya was concerned with collecting and describing the native flora which is now contained in the excellent herbarium and museums within the garden, and in the publication of a "Flora of Ceylon" dealing with the flowering plants in 1900.

Simultaneously with this work the garden occupied itself with the introduction and acclimatization of the useful and ornamental plants of other countries. In this way cinchona, cacao, rubber, coffee, and vanilla were introduced as plantation crops, and the extension of the cultivation of tea, cloves and nutmegs was much helped.

Fine old examples of these early introduced economic plants are still to be seen in Para rubber; a giant brazil nut tree; specimens of the nutmeg, now 100 years old and still bearing fruits; cinnamon, allspice, cloves, and cassia bark, all represented by large examples.

Near by is a younger plantation of economic plants of various kinds which includes *Taraktogenos Kursii*, the oil from which is now used in the East for curing leprosy. It was of interest to note the rapid growth this collection had made in the short time since it was planted.

The main entrance to the gardens on the Colombo-Kandy road is conspicuous for the magnificent row of *Amherstia nobilis* to the right, and the large oil palms just within the gates. The piers of the gates are covered by *Bignonia*.

Arranged in sections, which are lettered and planted systematically, it is easy to find any group of plants the visitor may be interested in. The palm collection as one would expect is very extensive and contains a good example of the interesting double coronut—*Lodoicea sechellarum*, and the

sealing-wax palm *Cyrtostachys Renda* attracts attention by the brilliant colouring of its sheathing leaf-bases. Crowning an eminence was a very fine flowering Talipot palm (*Corypha umbraculifera*), and not far away by the lakeside the giant bamboo, *Dendrocalamus giganteus*, was raising its culms 120 feet high, being closely followed by *Gigantochloa aspera* which reached 80 feet to 100 feet high, both a contrast to the Japanese *Bambusa nana* which only grows a few feet and is largely used here and elsewhere in the tropics as a hedge plant.

In the lake itself the sacred Lotus lily (*Nelumbium speciosum*) has become a pest, and has to be kept within bounds so as not to kill out the many other smaller water things planted near the margins.

The herbaceous garden is planted much on the same lines as in our own botanic gardens, the most convenient from the student's point of view. It contains a wealth of beautiful flowering dwarf plants which would be lost among the taller growing things in the other collections.

Peradeniya has a good collection of the more interesting conifers, one of which, *Araucaria Cookii*, grows to a height of 120 feet: *A. Bidwillii* also reaches a great height, so does the Moreton Bay pine *A. Cunninghamii*. Among the Cupressus were *C. macrocarpa*, *C. funebris*, and *C. Knightiana*. *Agathis robusta* also makes giant trees here; so does the Malayan *Podocarpus cupressina*; and *Gnetum Gnemon* flowers and fruits.

Among other interesting trees I noted *Michelia Champaca*, the flowers of which are used for decorating ladies' hair, and also as a Buddhist temple flower: *Magnolia grandiflora*, 50 feet high; *Cananga odorata* which gives a perfume much used by the Chinese: *Berrya Ammonilla* from which is obtained the Trincomale wood much sought after by cabinet makers for its beautiful markings; *Diospyros* with wood taking a brown polish and black spots; *Mallotus philippinensis* with weird corrugated stems and a good timber tree; *Pterocarpus santalinus*, the santal wood; and a big Mango 150 feet high. *Bassia longifolia*, a native tree of Ceylon yielding oil much used by the natives for rheumatism, was just opening its soft pink buds. *Wormia Burbridgei* 20 feet high was covered with its yellow flowers, and so were several species of *Brownea* with their brilliant scarlet panicles.

Several climbing plants not common in our gardens were seen in perfection: notably *Congea tomentosa* with long loose sprays of mauve-pink velvety bracts; the tropical American *Petrea volubilis* with mauve and pink racemes; *Odontadenia speciosa* from South America; *Camoensia maxima* from tropical Africa with large white scented flowers, *Ipomoea*, *Porana*, *Roupelia*, *Thunbergia*, *Wagatea*, and many others. Indeed, a special feature is made here of climbing plants noted for their beautiful flowers and bracts. The collection of Bougainvillaeas contains some very beautiful examples of the latter.

The section of the garden devoted to fruit-bearing trees contains Mango, Sapodilla, Rambutan, Loquat, Java Almond, Litchi, Anchovy Pear, Grape Fruit, Mangosteens, and many others.

One of the most showy of the larger trees in flower was the scarlet flowered *Spathodea campanulata* of tropical West Africa, and, possibly the most interesting, a plant 35 feet high of the Brazilian composite *Stiffia chrysantha*. One might go on describing the wealth of interesting trees and plants to be found in Peradeniya, but this would occupy the whole of my time.

Leaving Peradeniya, I took the train for Nuwara Eliya, which is 6,200 feet above sea level and which, as I mentioned before, has an average temperature of 58° and an occasional frost.

The train journey is one of great interest and beauty, as the line runs through a large planting district and mile after mile of tea gardens occupies the mountain sides. Many of the railway stations are themselves pictures of floral art; one of these had a fence clothed with the "Morning Glory" (*Ipomoea rubro-coerulea*) covered with its delicate blue flowers. Bougainvillaeas and Allamandas are also much used for this purpose, while at Watagoda, *Datura suaveolens* had escaped for some distance on either side the station and its white chalice suspended in profusion from its branches—an ever to be remembered sight. Lantanas were very common everywhere.

I was intrigued to see the Cuban hemp (*Furcraea gigantea*) apparently wild all along the line for several miles. This I later discovered was planted some years ago by a Fibre Company who obtained a concession from the Government to use the land for a certain distance on either side the line for growing its fibre-producing plant.

At the junction Nanu Oya, where the line is continued to Nuwara Eliya by a toy train, I was met by a friend's car and did the last part of the journey through the pass, which is very beautiful. Here and there, standing like sentinels, was the giant *Lobelia nicotianifolia*, the beautiful native tree fern *Alsophila crinita* and the lesser *Hemitelia Walkerae*, while now and then one saw large colonies of the Ceylon daffodil (*Ipsa speciosa*), interspersed with *Exacum zeylanicum*. Large plants of *Rhododendron arboreum* were common.

Nuwara Eliya stands in an amphitheatre of hills and is largely used as a health station. The Governor and the Colonial Secretary have residences here, attached to which are very interesting gardens in which are grown many annuals common to English gardens, such as sweet peas, antirrhinums, etc. Carnations also do very well, and the pretty *Dierama pulcherrimum* was almost a weed, but is very valuable for its cut flowers, which travel well. The gardens have a special interest for the large number of fresh vegetables, which are grown in them to be sent down to Colombo—peas, beet, carrots, leeks, cauliflowers and artichokes being the chief kinds which succeed.

There is also a large public park in which many good things are to be found. Several kinds of roses flourish, and some of the Australian Acacias and Eucalyptus make large trees. In fact, on the hills about Nuwara Eliya *Acacia melanoxylon* is one of the chief trees planted because of its great value for firewood, the chief trouble with it being to keep it clear of the semi-parasitic mistletoes which appear to be partial to it.

In the park is a very fine avenue of *Cupressus macrocarpa* which gives welcome shade on bright days, and all about on the hills are huge specimens, 30 to 40 feet high, of *Rhododendron arboreum*.

My next stage took me to Hakgala Gardens, six miles south-east of Nuwara Eliya on the Badulla road, 4,100 feet above sea level. These were started in connexion with Peradeniya in 1861 as a hill station for growing Cinchona, and many of the older plantings are from seedlings raised here and afterwards distributed to the planters.

In 1882 MR. WILLIAM NOCK was appointed superintendent, and he began to lay out part of the estate as a botanic garden, and largely increased the cultivation of other useful and beautiful plants of which Hakgala bears witness today. The present area under cultivation is 55 acres out of 500 acres which are available for development.

The garden faces due east and has an imposing back ground, the Hakgala rock, whose highest peak rises 1,400 feet above the garden. This rock is clothed with *Rhododendron arboreum* in two colour forms. Much experimental work is being carried out at Hakgala in the acclimatization

of exotic trees which are likely to be of value as timber trees, and many of the Australian Acacias and Eucalyptus are already showing their suitability for this purpose. Others are being tried for their economic products, such as the bark for tannin, etc. A large section is also devoted to grasses and other fodder plants with a view to their suitability for feeding purposes on the barren patanas.

From this point on a clear day, a view of 40 miles can be obtained over magnificent mountain scenery upon which the limits of cultivation are clearly discerned. Some years ago the Government passed a law that all land above 5,000 feet should be reserved for the native fauna and flora. It is true that there are areas of cultivation above this elevation, but they are those which had been sold previous to the passing of the Act, and are chiefly under tea, which is used to increase the flavour of the tea produced at the lower elevations.

Mention must be made of the very interesting collection of native plants which have been collected by MR. NOCK and planted in a special section of the garden. Among them I noted *Ipsea speciosa*, *Viola serpens*, *Exacum macranthum*, *Impatiens Hookeri* with handsome white flowers veined with red, *Lobelia excelsa*, *Spilanthes Acmele*, *Arisaema Leschenaultii*, *Satyrium nepalense*, *Phaius Wallichii*, *Eria bicolor*, *Calanthe veratrifolia*, and the pretty little skullcap *Scutellaria oblonga*. On the trees were *Dendrobium nutans* and the sweet-scented *D. heterocarpum*; *Lycopodium squarrosum* and *L. serratum* were also plentiful. No where have I seen so good a collection of the forms of *Begonia Rex* as at Hakgala, where they revel in the moist conditions. The fernery is also a special feature: and besides many noble specimens of *Alsophila crinita* and *A. glabra* the native tree ferns, there are good examples of the Australian *Alsophila Cooperi* and *Dicksonia antarctica*, and the New Zealand *Cyathea dealbata*.

Fuchsia arborea, which is known as the Ceylon lilac, and the Peruvian *Fuchsia F. corymbosa* (two plants which years ago used to be seen in our green houses, but now alas rarely met with) were seen in large bushes. *Brunfelsia uniflora* also made a very showy border plant, as did *Salvia leucantha* and *S. furinosa* which was represented in two forms, one of which had deep violet flowers.

Many annuals are grown at Hakgala for decorative purposes, but owing to the ravages of surface caterpillars they have to be protected in the young stage with paper collars placed around each seedling.

Among economic plants are good trees of *Syncarpia glomulifera*, the New South Wales turpentine tree, also useful as a timber tree; *Pinus longifolia*, which gives a good resin, and the bark used for its tannin and for fuel for smelting iron, *Juniperus bermudiana*, the pencil cedar; *Eucalyptus globulus*, from which oil is distilled from its fresh leaves; *Tristania conferta*, a good shipbuilding wood; a very large specimen of *Cinnamomum Camphora*, from which camphor is distilled from leaves, twigs and roots; *C. Cassia* of South China and Burma, the source of the "Cassia buds" of commerce used as a spice in confectionery; the Black Guava *Psidium Cattleianum*, the fruits of which are here produced twice in a year and used for jelly making; *Sapindus saponarius*, the seed vessels of which are used as soap and the seeds as buttons; *Citrus buxifolia* the marmalade orange, which annually gives good crops of fruit; and the mountain Papaw, *Carica candamarcensis*, the fruits of which are used for stewing, but are not used as dessert like those of *C. Papaya*.

Several hours were spent in the jungle which adjoins the garden, where numbers of small filmy ferns and mosses clothe the small undergrowth, and many epiphytic orchids (*Eria*, *Dendrobium*, *Coelogyne*) abound; whilst making a natural carpet was *Selaginella brachytachya*.