

## PRUNING IN THE TROPICS

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**T**HE cultivator of estate products in the tropics has a certain amount of very useful literature at his disposal based on the knowledge acquired from experiment stations both locally and abroad, but in horticultural subjects and particularly that of fruit growing, the cultivator is not nearly so fortunate.

It is in fact only of late years that the commercial possibilities of fruits in the tropics have come to the fore, stimulated doubtless by an increasing demand for such in the European and American markets, by the gradual overcoming of transport difficulties and to the successful methods adopted by growers in Florida, West Indies, Southern Africa and the warmer parts of Australia in growing and marketing such produce.

With the increase of fruit cultivation locally there arises a demand for some sound methods of cultivation applicable to varying conditions whereby such fruits may be made a source of profit. The literature available on the more promising subjects is scanty but it does emphasize the importance of selection of the best material in the first place, the best localities in which such can be grown, and other important items.

As progress in fruit cultivation is made, however, the grower generally meets many difficulties, prominent among which are the maintenance of his trees or shrubs in a manner most likely to produce the best fruit, and the obtaining of the maximum amount of fruit from them. It is here that some information in the art of *pruning* is called for since the quality and quantity of fruit or flower is probably due more to the consideration and skill shown in pruning than in any other branch of cultivation.

It has to be acknowledged that with the demand for the best quality fruit by the present day consumer, the best and most up to date methods of cultivation are required to meet the demand. Pruning must be treated as a very necessary branch of such cultivation and not as something apart from the general

practices. There is however in most countries a wide range of opinion as to the merits of the various types of pruning, though certain principles and practices have been arrived at to guide the grower in most cases.

Some fruit growers are most anxious to prune, others are not, and individual opinion and experience count a great deal, especially in the tropics, for pruning comprises a multitude of practices and ideals which vary according to type or variety of tree or shrub, the elevation, the rainfall, or the soil. If pruning has to be done we should have a clear conception as to why we do it. It is sometimes contended that pruning is a necessary evil in that the plant would be able more effectively to resist certain diseases were pruning not required. This is because pruning does create wounds however well carried out, but with a healthy tree and a clean operation there is little to be feared in this respect.

What then is the main object of pruning? For the guidance of the less experienced grower it is briefly the removal of all superfluous and useless wood in order to allow free access of light and air and by such removal allow additional energy to be directed in a way to strengthen and improve the plant. In some cases it is to the particular requirements of the grower and sometimes in the direction of some particular form, but chiefly it is undertaken for the better production of flowers or fruits. No arbitrary rules can be laid down for thinning or pruning in general, as the requirements of different trees or shrubs vary enormously, hence the many systems and methods of pruning.

For the more experienced grower a study of the physiological aspect of the operation might be illustrated. It is well known that the tree has two forms of nourishment, from the soil by means of its roots and from the air by means of its leaves, and the substances attained from both these sources are essential for the growth and health of the plant. The nitrates obtained by the roots and the carbohydrates built up by the leaves should constitute some form of balance, and where this balance is upset, an unfruitful tree of vigorous growth or a sick or starved, and also unfruitful, tree results. In the former a surplus and in the latter a deficiency of nitrates is indicated, always remembering that the nitrogen supply determines the amount of vegetative growth.



Plate 1.

Large Litchi tree showing open centre allowing of ample circulation of light and air.



Plate 2.

A young budded Citrus in nursery bed before heading.

In the former instance the liberal supply of nitrogen causes vigorous leafy growth and as long as this continues little or no fruit is produced. In such cases a cessation of manuring should encourage fruitfulness or failing that a pruning of the roots to so reduce the nitrogen supply as to secure a balance between nitrogen supply and the amount of carbohydrates manufactured by the leaves.

In the latter instance, the sick or starved tree, the indication is that it has exhausted the nitrogen supply in the soil and is therefore suffering from nitrogen starvation which effects both growth and fruitfulness. In this case a pruning out of all sick growths and a general shortening back of the remaining shoots should be undertaken together with a forking up of the soil around the tree and application of a heavy dressing of manure. The nitrogenous substances in the manure will in a short time induce young and healthy growth and this in its turn will increase the carbohydrate supply, the tree thereby returning to, or attaining, a fruitful condition.

The fruit growers' aim is primarily the production of fruit buds in his trees or shrubs, he also requires a definite shape and strength in structure of the plant to bear and support such fruit, and all this is attained by a correct method of pruning. The tea planter prunes his bushes for the production of the maximum leaf crop combined with the health of the bush and accessibility to the leaf crop, and the collar pruning of tea can be instanced as probably the most drastic form of pruning it is possible to apply to any tree or shrub. Even the rubber tree is not always immune from pruning as a low branched tree must be rectified to form a clean straight stem for tapping purposes. Plantation cocoa requires periodical thinning rather than any established method of pruning, the object here being the admittance of light to a certain degree and the circulation of air to the centre of the tree. With coffee the same principles apply, but both in the young stage, by topping at the required height, and in the older stages of growth pruning has to be adopted to ensure and maintain a suitably shaped head, usually in a spreading form and to the convenient height for picking purposes, of approximately five to six feet.

Among purely horticultural subjects the pruning of the garden rose bush is one presenting difficulties to the average gardener, and this will be dealt with in further detail later since

the rose bush growing in the low-country, requires a different method of pruning to its counterpart in up-country gardens, and both operations vary from the principles adopted in England, which is generally considered the home of the rose. Of the variety of trees used for shade purposes along the roadsides of this and other tropical countries, very few would properly serve this purpose were it not for pruning and shaping.

It will be seen therefore that the operations included under the term "pruning" have a very wide range and it extends even to the pruning or checking of the root growth of some trees.

With fruit trees grown under Ceylon low and mid-country conditions little systematic study concerning these operations have been made, but with Oranges, Grapefruit, Mangoes, Avocado pears and such like, a system is applicable. It must be remembered that these trees are evergreen and as a rule they require little treatment after the framework of the tree has been established. The framework is the main consideration and having attained this a thinning to allow air and sunlight to reach the inside foliage and branches is generally all that is required. Often, however, if the tree is not watched, strong overlapping branches are formed and if allowed to remain these unbalance the tree and from the fruit production aspect are a drawback. It is essential then to keep such branches cut back in the young growing stages otherwise if these thick growths develop and are later removed in an incorrect manner, a crop of vigorous shoots results, and the last stage is worse than the first. The correct way to prune such branches is to cut back parallel with the trunk or the main branches or laterals of the trees, and in no case must snags be left as it is here the twiggy shoots from adventitious buds develop, and a clean close cut will invariably heal well.

A suitable framework for the tree is attained in the early years. The best fruits at the present time are from budded or grafted plants and to form a good shaped orange or grapefruit tree the pruning necessary for the formation of a good head should be done at the time of planting or soon after the young plant has survived its transfer from the nursery to its permanent position. A standard habit should be encouraged and all low side shoots should be cut off at time of planting. As the terminal shoot that is left attains a height of 3 feet or so it should be cut back to 2 feet from the ground. The topping will result in several shoots being thrown out, and four or five of the



Plate 3.

A young budded Citrus in nursery bed after heading.

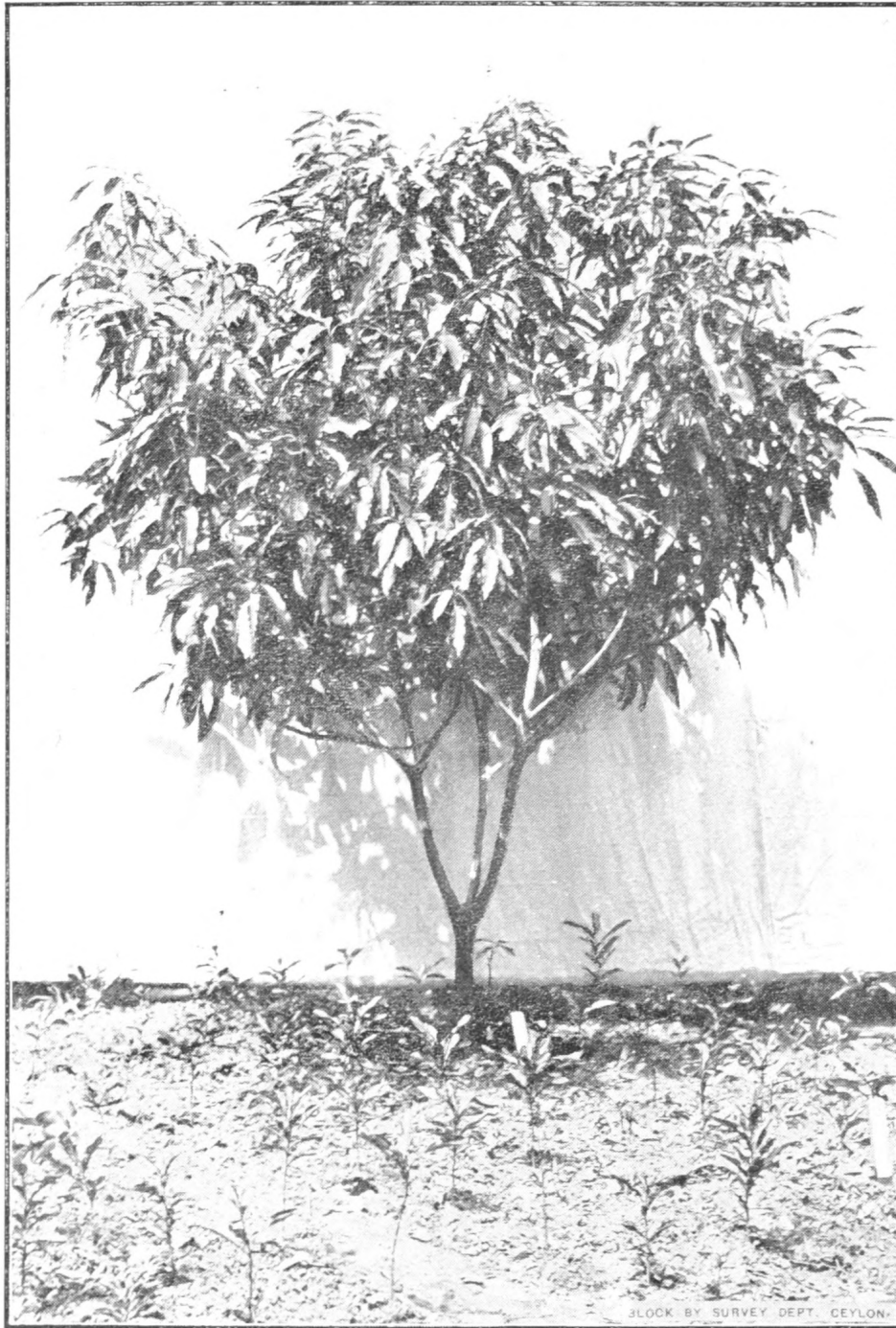


Plate 4.

A two year old grafted mango showing head formation.



Plate 5.

A young grafted mango in nursery bed after heading.

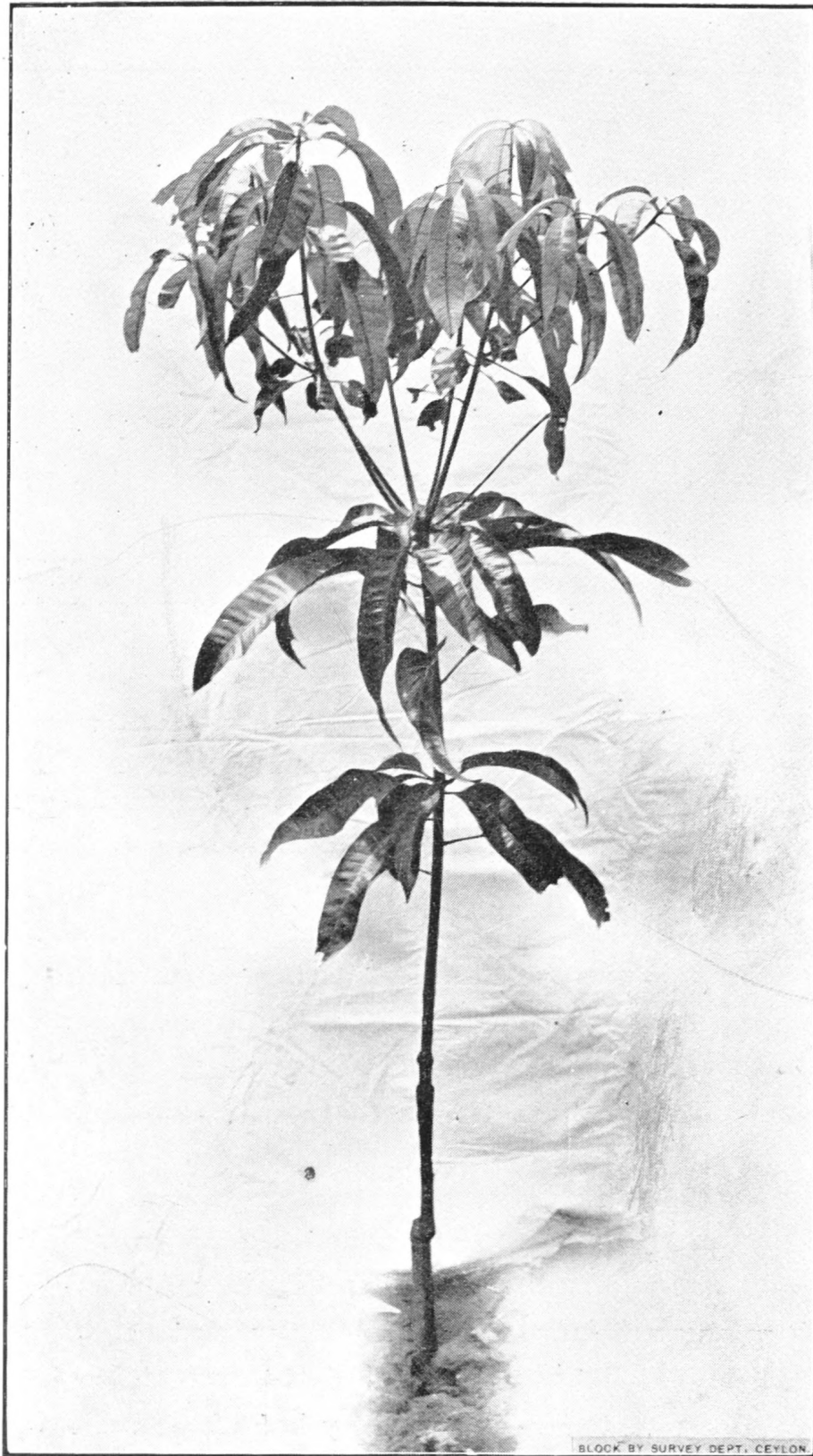


Plate 6.

A young grafted mango in nursery bed before heading.

strongest of these should be selected and the rest removed, care being taken as to placement around the main stem of the shoots left to grow. The shoots, as they grow, form the framework of the tree and should be left to strengthen and develop and all assistance given them by good cultivation.

Oranges and grapefruit treated in this way invariably balance themselves as they develop, but the grower will sometimes find that numerous short shoots will later develop from adventitious buds on the main stem and branches, these sometimes being observed from the base to the top of the tree. Those that develop from the main stem, and particularly those below the junction of stock and scion, should obviously be watched for and removed at once but those arising from the branches forming the head of the tree may be left for a time, as although they rarely produce fruit buds they do in fact assist the tree to develop. These shoots along the branches should however be removed in the second or third season when the diameter of the main branches have increased and a good head has been formed. Other difficulties arise when the trees form thick sucker-like shoots, often termed water shoots, and a not uncommon occurrence in our damp climate. Unless one or two of these are required to fill in the head of the tree they should be cut back close to the lateral branch from which they arise, again leaving no snags to give rise to adventitious shoots, or otherwise these interfere with the development of the permanent branches.

The framework for the mango and such fruits which are stronger growers than citrus call for the same principles of heading but this can be done at a greater height from the ground, usually at from three to four feet instead of two feet as in citrus. Having formed the framework of the tree, good cultivation should be afforded to induce vigorous and rapid growth up to its third or fourth year and the maturing of any fruit that may form during this period is not to be recommended. Having attained this age different measures are called for to induce fruit bud formation and development, and it is here that pruning and thinning out of branches that have tended to become thick and matted is called for, assisted by the withholding of water if possible to some degree and by a lesser amount of manuring, as otherwise these stimulants will naturally result in a continuation of vigorous foliage and growth at the expense of the fruit crop.

Many fruit trees call for a purely upright standard habit instead of the round head and controlled main stem heights indicated above. Such fruits as the Avocado pear, Sapodilla and Mangosteen are examples where the tree can be allowed to develop its natural shape, and where every advantage is obtained by maintaining such. All these have an upright symmetrical habit of growth but Avocados sometimes show a tendency, mostly with seedlings however for the plant to shoot up and not spread as it should. The remedy is to cut back the terminal shoot to encourage a more branching habit. Little or no pruning beyond occasional thinning and removal of dead wood is called for and the same applies to such fruits as the Durian, Rambuttan, Soursop and Custard Apple. The Chermoyer naturally forms a small tree 15 feet or more in height and generally with a well shaped round head on a standard stem but often under good cultivation this tree will produce thick shoots from the main stem and base of branches, not unlike water shoots of citrus, and these where they occur should be cut out flush with the stem or branch and the scars tarred over.

Up-country fruit trees present considerable difficulties in formulating any pruning system as conditions are so variable, and each group and often individual trees of the group, must be treated on their own merits. The mode of growth of good varieties of imported Apples, Pears, Peaches and Plums where they are attempted in Ceylon reminds one very forcibly that they are out of their proper environment, and very rarely can a fine well shaped head be found owing to the poor and stunted growth, the trees usually forming only a few leaders and no lateral shoots at all.

Until some growth is made the question of pruning does not properly arise, and this incompatibility of the imported grafted plant to Ceylon conditions can no doubt be remedied by a change of stock.

The common up-country cooking pear and peach, to quote two examples only, are now well acclimatised to up-country conditions and soil and should be hard to beat for use as stocks on which to bud material of imported varieties. Until something better than the present material is available on which to experiment, any recommendation on pruning such would be little more than guesswork.



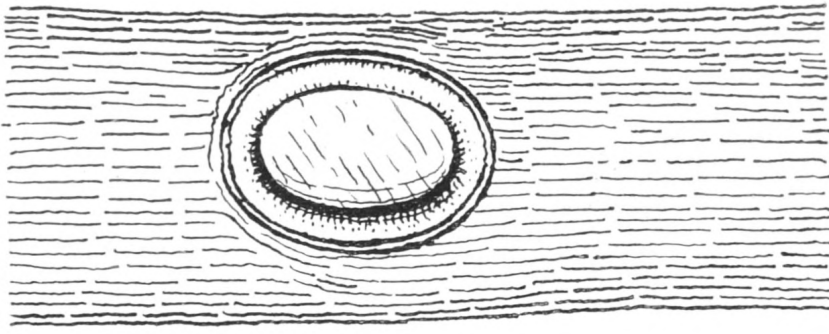
Plate 7.  
A well-balanced "Ilama" on "Soursop".



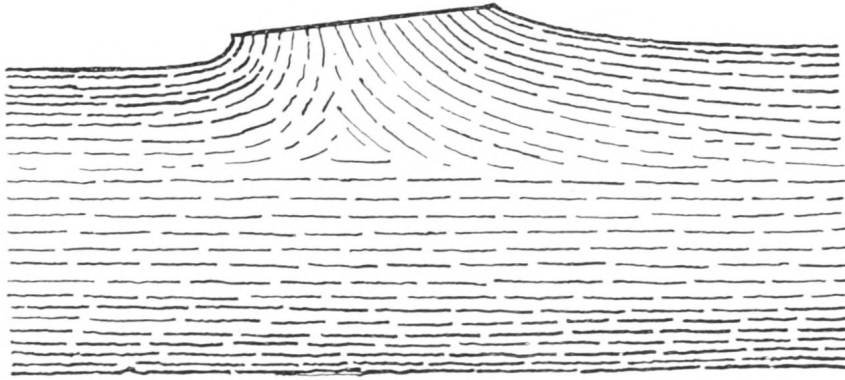
Plate 8.  
A young grafted grapefruit before thinning.



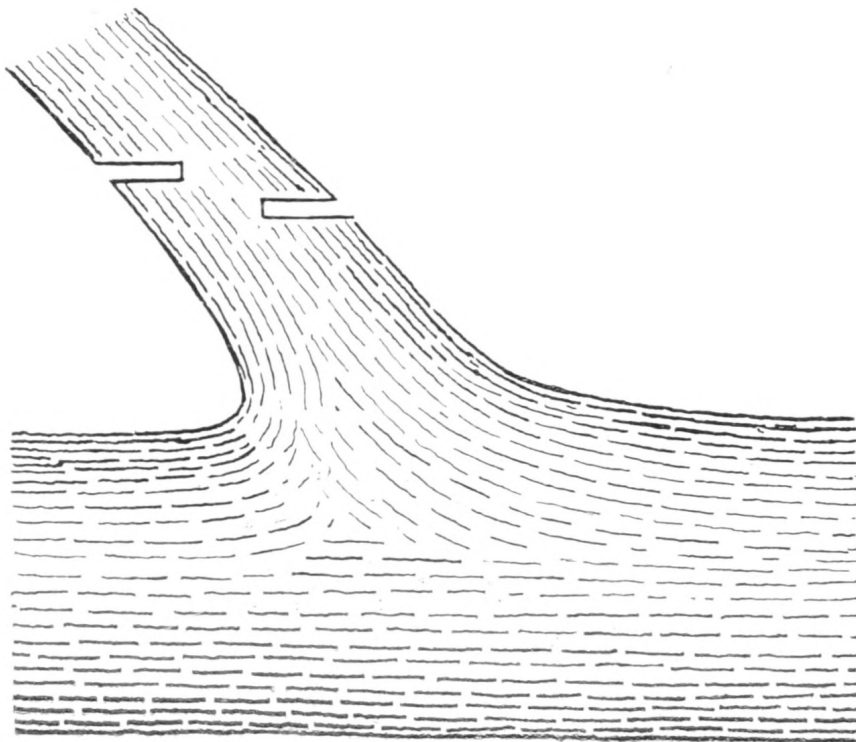
Plate 9.  
A young grafted grapefruit after thinning.



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Plate 10.

The correct method of pruning large branches.

In dealing with roses, it should be recognised that the best results are obtained in up-country districts, but some success does attend their cultivation in the low-country if "Tea" or "Hybrid Tea" varieties are grown and these on their own roots, *i.e.*, propagated by cuttings. The total absence of a resting period and resultant perpetual growth calls for regular and frequent pruning, or more correctly cutting back. In low and mid-country the object is to eliminate the older wood in conjunction with the encouragement of strong new growth. Reference was made earlier to the drastic collar or clean pruning of tea at low elevations where the bush is cut low and deprived of all growing shoots with a resultant loss of some of the bushes accordingly. A more modified form of pruning, termed "Rim lung" pruning (see *Tea Quarterly* Vol. VII, Part 1), is now being experimented with, whereby two or three of the stems with a reasonable amount of leaf is left at time of pruning to enable the bush to continue the manufacture of food supplies, and the result is a great reduction in losses as a result of pruning. Deficiency of starch — the storage material — in the roots of a plant which is in perpetual growth is chiefly the explanation of non-recovery after any heavy pruning, and it applies not only to tea but to a host of other plants also and particularly to the garden rose.

Bearing this in mind, no rose bush in the low and mid-country should be pruned so low as is usually advocated in books on rose culture for temperate climates, though the latter can be applied in a more moderate form up-country. As a general rule the removal of all *worn out* shoots, any dead wood or thin spindly growths after flowering and when the bush is usually in the stage of minimum growth is all that is called for. Roses flower on the new wood, and flushes of new wood occur three or four times a year, so that frequent attention in shortening is called for. In passing it should be mentioned that the soil should be forked up and manured after such operation.

A very important part of pruning is to know the characteristics of the plant you are dealing with, for each has its peculiarities and all trees do not fruit in the same way. A method of pruning beneficial to one type of tree may be most harmful to another type, and the operator may be cutting out too much, or too little wood. The apple tree for example produces short stubby fruit spurs which produce fruit over a number of years

with consequent little wood growth and these spurs must be preserved at all costs. On the other hand a peach tree bears its fruits on the wood of the previous season's growth so that a regular supply of new wood should be produced each year to maintain crops. Citrus trees bear fruit in clusters in the axil of the leaves or in small lateral or terminal cymes or panicles as can be seen very clearly in the mandarin, so that as before stated it is wise to prune very lightly or not at all, an occasional thinning of thick growth only being required.

Summing up therefore it can be definitely stated that the principles of pruning in the tropics remain the same as for sub-tropic and temperate plants but owing to the absence of a definite resting period and the consequent evergreen state of the plant the practice of pruning is effected thereby and a lighter form, more properly termed thinning, is generally the best. A sick tree will often call for a heavy or hard pruning to effect recovery, and so will the healthy tree that is making far too much head growth at the expense of the lateral branches and particularly if this is a fruit tree. But beyond such instances, and in the pruning necessary in the young days to form the plant framework, only periodical thinning by the removal of the weak, sickly or dead portions of wood is required, thus maintaining plenty of light and air to all parts of the tree. Generally speaking therefore pruning (or thinning) attains the following objects.

(a) By checking or modifying the vigour of the plant more fruit and less wood bearing shoots are formed.

(b) The continuity of yield is maintained together with a maintenance of the quality of fruit.

(c) The maintenance of the tree in a healthy condition and to keep it within manageable shape and limits.

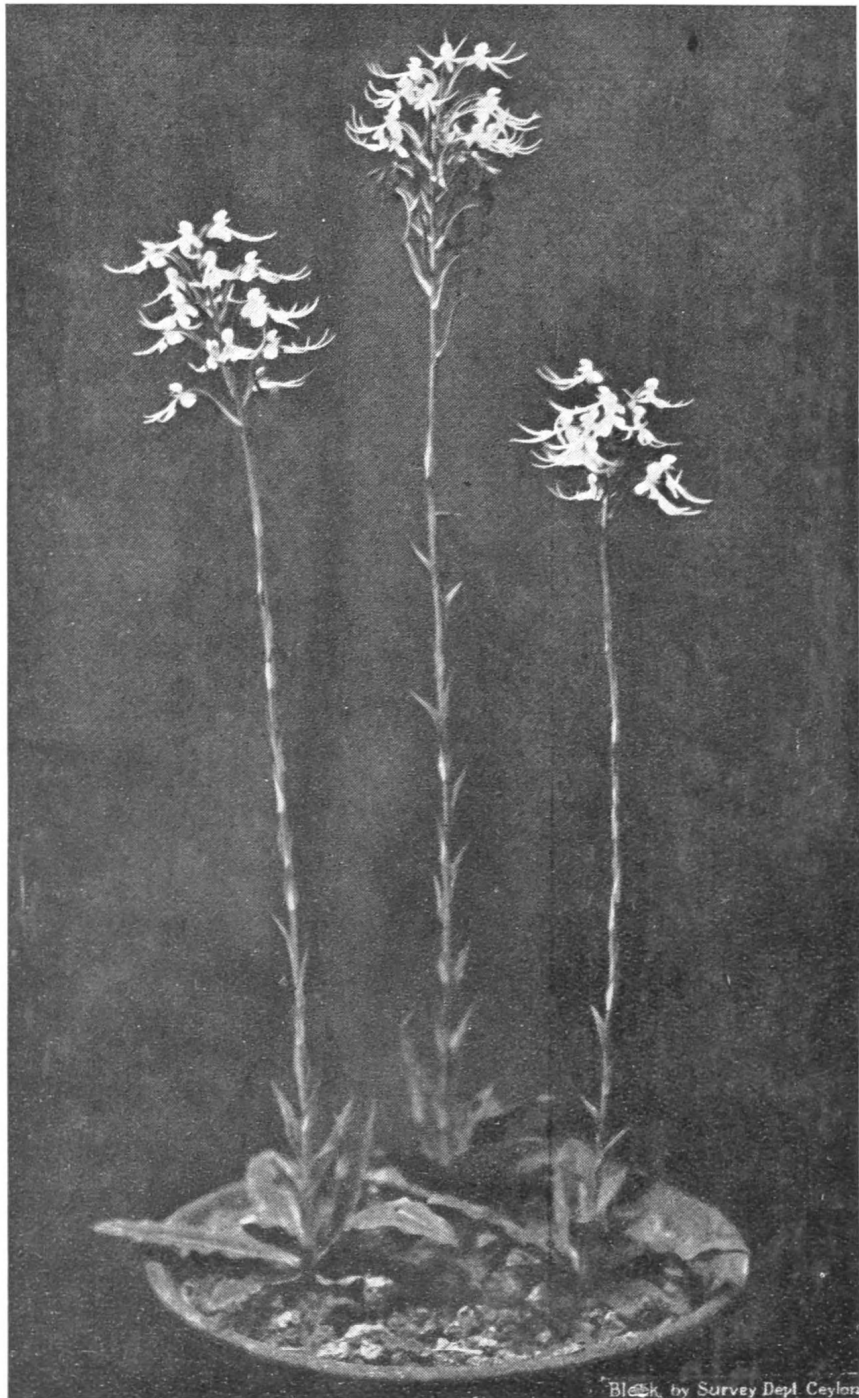
The best time to prune any tree or shrub in the tropics is generally at the period when it is in a minimum state of growth. This occurs usually just after the flowering and fruiting periods or just prior to the flush of new growth. The former is preferable, but should either period coincide with periods of severe drought it is wise to postpone the operation as otherwise sun scorching and exceptionally dry winds can cause considerable damage to the plant so treated and may crack the wounds.

The operation of pruning necessitates the use of a sharp knife and saw, and emphasis must be made on the use of *sharp* implements alone or much damage will be caused to the tree. Where shoots are shortened the cut should always be made just above a bud, and in a slanting direction. Where it is necessary to cut out the whole shoot or branch this must be cut close in and flush with the branch or stem from which it arises leaving no snags from which adventitious or dormant buds would arise. In cutting out branches of one to two inches in diameter these too should be cut back close to the stem, preferably with a pruning saw and these finished off with a sharp pruning knife leaving a smooth surface to the cut. In the removal of really large branches, the cut should be made with a saw, from the underside first for a quarter or so of the diameter of branch, and then from the upper side, a few inches forward of the under cut. The stub is then sawn off close and the surface planed over. This will prevent the splitting of the wound or the tearing away of the bark by the weight of the branch that is being removed. Where large branches are thus removed they should readily heal if cut in close to the stem or laterals and the surface left smooth. This healing is effected by means of a callus which forms from the growing tissues between bark and wood. To avoid infection pending the callusing over of the wound it is necessary to treat the surface of the wound with a good dressing of the best local tar. The application does not actually hasten the healing process but it arrests decay and preserves the surface till such time as a complete callus over the wound is formed.

Root pruning is another method applicable to trees both in the tropics and elsewhere. In more temperate regions it is employed mostly to confine the roots of a tree so that they do not interfere with other neighbouring plants, but in the tropics the method is more generally in use and for the purpose mainly of a check to the tree's exuberance of growth. Root pruning checks growth by cutting off part of the food supply and with an over vigorous tree, a check to growth will often induce fruitfulness.

A trench is cut and excavated around the tree at a distance from the main stem according to the size and age of the tree, varying from 3 feet for a small tree to 10 feet or so for a very large tree. The trench should be three to four feet deep and one to one-and-a-half feet in width. As the roots are unearthed in the trench excavation they should be cut back with a very sharp knife and finished off as for branch pruning. It is possible also to carefully undermine and sever the tap root should such be suspected of entering the subsoil to the disadvantage of the tree. The trench should be left open for a few weeks, after which it should be refilled with the excavated soil to which well rotted cattle manure or other humus should be mixed at the time of refilling. This method of pruning is more applicable to individual specimen fruit and flowering trees and is not generally employed outside small gardens.

All good cultivation should aim at encouraging a fibrous root system and the prevention if possible of strong woody roots into the sub-soil.



*Habenaria crinifera* Lindl.