COFFEE IN SOUTH INDIA*

SOUTH INDIAN coffee is grown at about 4,000 feet above sea-level. The soil is of medium texture and contains a little laterite, the slopes are not usually very steep, but the general lie of the land is hilly. Most of the coffee appears to be in a healthy condition.

Arabica coffee is the chief variety cultivated in South India. There are also areas of hybrid varieties known locally as "Robusta" although some of the leaves are of the large dark Liberian type; the fruits are in clusters as in the Robusta type, but larger than the Robusta usually grown in Malaya. The older fields are all planted with Arabica seed imported from Mysore, but practically all the new planting is "Kent's Arabica".

The Arabian bush is much more uniform and symmetrical than are the varieties grown on the plains. It has one main central shoot from which the primaries grow parallel with the ground, the secondaries being almost at right angles in the same plane. The "Kent's Arabica" is a very similar bush, but the branches tend to grow in a more upward direction than the Mysore variety and curve over at the ends.

The "Robusta" is usually allowed to grow unchecked and becomes a large bush as much as fifteen feet high, the branches spreading out so that they overlap from about eight feet above the ground.

Planting.—Basket plants are much preferred to "stumps" as they develop very much better in the field and average four inches at two years old instead of only three as in the case of "stumps", while the general appearance of the basket plants also indicates that they are more vigorous. Another objection to stump planting is that as many as 40 per cent may die off shortly after planting out.

The planting distance on all estates is 8 feet by 8 feet square at which distance the mature bushes of Arabica just touch, but the "Robusta" intermingle.

The only form of cultivation is the digging of trenches along the spaces between the rows regardless of the contour of the land. These trenches are 18 inches deep, 18 inches wide and usually about 34 feet long, unless there is a natural obstacle such as a rock or a shade tree. If an artificial stop is left it is from 3 to 4 feet long.

The trenches are either cut in alternate spaces and left till they are full of debris, when fresh trenches are cut in the other alternate spaces, or they are cut in every fourth space. In the latter case it is usual to cut a fresh set of trenches each year, so that every space is dug over once in four years. Owing to the porous nature of the soil there are no signs of the overflow from these trenches starting streams down the hill.

Weeding.—The weeding is done by hand or scrapers. It is essential that the blades be not long enough for the tools to be used sideways and the handles only just long enough to obtain sufficient leverage to remove the roots of the weeds from the soil.

During the monsoons it is usual to hand pull only the big weeds so that the small weeds assist in checking soil erosion; scrapers are only used between the monsoons. As a result of this light weeding, the fields are dirty by the end of the south-west monsoon. During the drought preceding the break of the south-west monsoon practically all the weed growth is killed with the result that "Dry wash" frequently starts.

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Shade.—It is quite usual to see coffee grown under jungle shade, all trees of eighteen inches diameter and over being left when the jungle is felled for planting. After completion of the felling, groups of big trees are thinned out so that there is a fairly even stand of shade throughout the field. Some of the coffee growing under jungle shade is of excellent appearance.

The shade tree most commonly planted is *Grevillea robusta*, which grows very well. The planting distance varies between 15 and 25 feet square, the most usual being 20 feet. Closer planting makes the shade rather too close and results in less vigorous growth of the coffee. The object is to create a complete shade, but not so dense as to be definitely dark.

The Grevilleas are often topped at between 18 and 20 feet and kept at that height to encourage the trees to branch. The shade requires to be kept well above the bushes so that it does not "draw" the coffee.

The wild Jak Fruit (*Artocarpus* sp.) is considered to be a suitable tree for shade in coffee. On one estate dadaps (*Erythrina* spp.) were interplanted with the Grevilleas. These trees are topped in September or October, the branches being placed between the rows of coffee. Some of the old dadaps, 40 to 50 feet high, were still looking healthy and being topped annually.

Pruning.—The Arabian variety is usually topped at 4 feet 6 inches. If a bush has been cut back too low, or if the head is broken off, a new shoot is allowed to grow till the brown wood is just below the correct height, at which point it is cut back at the correct height.

The centre of the bush, for 9 inches all round the main stem, is kept open to allow entrance of light and air. With this object in view the bushes are examined thrice annually, about April, during the south-west monsoon (July-August) and again in October just before harvesting commences. All secondaries within the area are removed and at the same time any suckers from the base are cut off.

The actual pruning is carried out early in the year, when all secondaries growing upward from the primaries and those which cross are cut out; at the same time, any others that have not a good show of flowering buds are removed. Any branch that has started to "die back" is also cut off just in front of the outside living bud.

The pruning system on one estate is as follows:

If the lower primaries start to die off, the strongest basal sucker is left on the bush and allowed to remain till it attains the correct height for topping. When it is topped the old stem is cut off just above the base of the sucker so that the old bush is entirely removed and the sucker becomes the main stem of a new bush. This practice is not general since some planters consider that bushes, on which the lower primaries die, should be cut out and replaced by supplies from nursery.

Harvesting.—In South India coffee flowers from March until May and the bulk of the crop is ripe in November and December; a few odd berries ripen during October and the harvest usually continues into January.

As a general rule, the bushes are not allowed to carry a crop till they are in their fifth year, but some of the more forward bushes may be allowed to carry a small crop during the third year. The primaries are not allowed to carry any crop, all flowers and small fruits being rubbed off when the centre of the bush is cleaned out during the flowering season.

The berries are collected as soon as they are a deep red colour, the fields being gone through as frequently as may be economically possible with the available labour force. The crop per acre varies between 4½ and 5 cwt. per annum.

Manuring.—The coffee is usually manured twice a year, in April and in October. For the first application, the dressing is 2 cwt. per acre and for the second it is increased to 3 cwt. On some estates even more than this is normally given, but owing to the low price of coffee in 1930 manuring had been considerably reduced and in some places entirely omitted.

The mixture is sent up by the Agents ready for application so that no exact details as to its ingredients were available. It is generally a complete mixture with nitrogen in the form of sulphate of ammonia, phosphate as bonemeal and potash as nitrate of potash.

The manure mixture is applied in a small trench scraped out with the hand, below the perimeter of the branches on the upper side of each bush. Each labourer has a tin which, when full, holds enough manure for one bush and he spreads the manure evenly along the trench previously opened out, then covers the mixture with a thin layer of soil. This work requires to be closely watched to make certain that the correct amount of manure is applied per acre, since with 680 bushes per acre, a small error in the amount applied per bush becomes an appreciable error in the aggregate.

Pests and Diseases.—Although the coffee berry borer *Cryphalus hampei*) is common at the lower elevations in South India, it has not yet attacked the up-country areas. In fact, no serious pest was brought to the writer's notice.

The coffee leaf disease (*Hemileia vastatrix*) is common, particularly during October, but the attacks are not virulent. The Mysore variety of coffee is more liable to attack than is "Kent's Arabica", but in no case was the disease serious. It is usual to spray any diseased bush with Bordeaux mixture, but the estimate for this work is frequently reduced or cut out by the Agents.

Occasionally, a case of black leaf rot (*Corticium Koleroga*) occurs. The effect of this disease is to turn all the leaves black and they subsequently fall off the bushes, sometimes collecting together and forming "birds' nests" among the branches.

This disease should be controlled by the collection and burning of all attacked leaves and branches. Bordeaux mixture effectively controls this disease as well as *H. vastatrix*.

Manufacture.—The site for the coffee store, as it is commonly called, should be as high up on the estate as possible, provided that there is an adequate supply of water, a ready access to a road and a sufficient slope so that the pulp can be carried out of the store by gravity assisted by the flow of water.

The water supply must be constant and should be as clean as possible. In order to ensure an ample supply, the ravine down which the stream comes is dammed at a suitable spot to form a reservoir, from which the water can be drawn if the stream runs too slowly. The reservoir also acts as a catch-pit for any stones or debris that may be brought down by the stream. To ensure that no stones or debris are carried into the factory, at least three pits must be provided in the duct, while beyond each pit there must be a piece of wire-netting placed across the duct to hold up any leaves or light material held in suspension.

The only machine used in the factory is the coffee pulper, which removes the outer coat from the fruit. This is done by squeezing the fruits between a stationary and a rotating surface. The most common type of machine is one with a narrow wheel of about 30 inches in diameter, with indentations which carry the fruit along and squeeze it against an inclined plane. The more modern type of machine has a cylinder at the bottom of the hopper which squeezes out the berries from the fruits, against an adjustable breast, which can be set according to the size of the fruits that are being pulped. The

larger machines of this type are fitted with rotary screens which separate the half-pulped fruits from those that have been pulped clean. This machine is more efficient than the previosuly mentioned type which allows half-pulped fruits to pass.

With both types of machines the fruits are carried through by a stream of water, which afterwards flows away with the pulp in suspension, hence the need for a good supply of clean water to the factory.

As mentioned previously, the store should be on the side of a hill, so that the fruit may be brought into the upper floor of the factory at the higher end and stored there. The pulpers are placed on the floor with a shoot leading from the storage room to the machines. The water duct and fruit should be close together, so that one attendant can control the flow of both the machines.

The berries from the pulpers are carried into a fermenting tank, which should be large enough to hold a maximum day's crop when filled to within six inches of the top.

On the up-country estates it is usual to have four fermenting tanks, since at altitudes of between 3,500 and 4,000 feet it is not always possible to obtain a satisfactory fermentation in three days.

The beans are allowed to remain in the fermenting tank till every particle of the mucilaginous layer has been removed by rubbing with the feet of the labourers.

When the berries have been sufficiently fermented they are floated off into the washing tank, which should be twice the area of the fermenting tank and have a separate supply of clean water flowing into it. Beyond the main washing tank is a smaller tank into which all the small and broken berries are floated to keep them separate from the main lot, as their presence in the main part of the crop considerably reduces its market value.

After the berries have been thoroughly washed, they are sun-dried. The drying may be done either on a cement barbecue or on hessian spread over a framework of lathes about three feet from the ground. The latter method has the advantage that it allows a current of air to pass under the beans thus expediting the drying process. If a barbecue is used it should have a convex surface so that all the water can run off rapidly after a shower of rain.

When the beans are thoroughly dry they are packed in sacks for despatch to the dealers.

A shed should be provided at a considerably lower level than the floor of the washing tank. In this shed a conical or pyramidal frame is erected, which will hold back pulp but allow water to drain through. The pulp from the machines washed down over the frame and left to drain, as is also the refuse from the fermenting tanks. At the end of the cropping season this pulp is mixed with dadap toppings or other vegetable matter and chemical manures, then kept under cover in the form of a compost for use as a coffee manure in the following October.