

DEPARTMENTAL AND OTHER NOTES  
 INCREASING THE CROPS FROM CEYLON  
 RUBBER ESTATES\*

INTRODUCTION

ONE of the most serious economic consequences of the war situation in the Far East is the interference, actual and potential, with the availability of rubber to the Allied Powers. At the time of writing, the industry in Malaya has been largely immobilised and there is a serious threat to the Netherlands East Indies. It is obvious that Ceylon, with its relatively small planted acreage, cannot make up more than a very small proportion of the lost production, but it is equally clearly a patriotic duty, as well as good business, for all producers in this country to take such steps to effect an immediate increase in output as may be compatible with the preservation of the capital value of their properties. A notice circulated by the Rubber Controller, dated December 28, 1941, has already drawn attention to this matter.

Hevea possesses remarkable reserves of capacity for the production of rubber, and yields can be immediately increased by adopting measures which are known to be more or less harmful to the tree. Damage caused by the extraction of latex, however, is only a matter of degree. The very operation of tapping involves artificial disturbance of the normal metabolic processes, and as a broad generalisation it is true that any increase in the yield of latex is accompanied by a reduction in vegetative growth. In the present emergency there is ample justification for drawing on the capital reserves of the tree provided the damage of a direct nature, *e.g.*, tapping wounds, Brown Bast, is not excessive.

The purpose of the following notes is to discuss the more legitimate ways and means of increasing crop, that is to say, the methods which will cause the least injury to the trees. Some may find application on one estate and some on another, and the action that may be taken in any particular area must be left largely to the discretion of the Superintendent. Unless otherwise stated the remarks apply only to mature seedling trees; a special paragraph is devoted to the tapping of budded areas.

---

\* Rubber Research Scheme, Ceylon, Advisory Circular No. 16.

## TAPPING INTENSITY

The most obvious way of boosting the crop is to increase the intensity of tapping, either by increasing the total length of tapping cut (or cuts) or by reducing the interval between successive tappings. The least estates can do at the present time is to tap at 100 per cent. intensity, *e.g.*, S/2, d/2; 2S/2, d/4, &c., if their present system is milder. On estates in the wetter low-country districts which have satisfactory bark reserves we recommend the temporary adoption of Double-Three tapping (2S/2, d/3, 133 per cent.) *i.e.*, two opposite half spiral cuts every three days. Attention was drawn to this system in the Fourth Quarterly Circular for 1940 under the heading "Planting Notes", and again in the Third Quarterly Circular for 1941 in the paper entitled "Some Wartime Problems of the Rubber Industry". For details the reader is referred to these two publications, but it may be stated here that in a tapping experiment on Dartonfield this system has given 17 per cent. more rubber over a period of four years than normal alternate day tapping (S/2, d/2, 100 per cent.), and 10 per cent. more than Double-Four (2S/2, d/4, 100 per cent.). This method of tapping was adopted on a number of estates in 1941 and although no comparative data are available the impression has been gained that most Superintendents are satisfied with the extra crops harvested.

Another system which has given promising results in the Dartonfield experiment involves tapping the tree on a half spiral on alternate days but on alternating sides *i.e.*, the tree is tapped on alternate days and each cut once in four days. The designation of this system is S/2, d/2, (2 × 2d/4), 100 per cent. Over a period of four years an apparent gain in yield of 9.5 per cent. over S/2, d/2, 100 per cent. has been obtained, though the reliability of this difference is rather uncertain.

At the present time we do not recommend the adoption of any system with an intensity of more than 133 per cent.

In areas of improved high-yielding material, whether buddings or seedlings, it is inadvisable to tap at more than 100 per cent. intensity on account of the greater danger of inducing a high incidence of Brown Bast.

A common method of increasing the intensity is to "double-tap", *i.e.*, tap in the afternoons as well as the mornings. With systems of 100 per cent. intensity or less this procedure is thought to be quite justified, even in normal circumstances, after a long wet period when tapping has been intermittent owing to rain. In such circumstances double-tapping is merely an effort to restore the theoretical intensity of the system by making up for lost tapping days. It should not, however, be carried out for more than a few consecutive days. When good tapping weather can be expected to persist, *i.e.*, in December

or January, it is suggested that an extra tapping be interpolated once in four or five days. Resort to this expedient is inadvisable if the intensity of tapping exceeds 100 per cent. *e.g.*, Double-Three (2S/2, d/3, 133 per cent).

#### DEPTH OF TAPPING

There is a tendency for tapping in Ceylon to be rather shallower than in Malaya and the N. E. I., and an immediate increase in yield could be obtained by tapping deeper. The aim should be to leave 1 mm. of cortex rather than  $1\frac{1}{2}$  mm., which is thought to be about the average on estates in this country. The implications of advocating deeper tapping at the present time when supervision is much reduced are fully realised, and it must be for each individual Superintendent, to judge whether his tapping depth can be improved without the risk of serious wounding.

Extra deep tapping is inadvisable on double-cut or full spiral systems owing to the resultant increase in the "ringing" effect.

#### THICKNESS OF SHAVINGS

A recent experiment on budded trees at Nivitigalakele showed that with the Michie-Golledge knife there is no advantage in taking shavings thicker than  $1/25$  inch on the S/2, d/2, 100 per cent. system. This corresponds to an average monthly consumption of about  $\frac{1}{2}$  inch. The results may be presumed to apply to seedling trees also, but they must be qualified by stating that the tapping, being under close supervision, was of a very high-class. Less expert tappers might advantageously consume more bark. It is necessary of course, to take rather thicker parings where the interval between successive tappings is three or four days.

The following annual rates of bark consumption are considered to be minima for the production of maximum crop in the wet zone. They assume the cessation of tapping for one month covering the wintering period. In drier districts the consumption should be slightly higher, both on account of the larger number of tapping days and the fact that the cortex dries out more between tappings.

|                          |    |                       |                                                      |
|--------------------------|----|-----------------------|------------------------------------------------------|
| S/2, d/2, 100 per cent.  | .. | $5\frac{1}{2}$ inches |                                                      |
| 2S/2, d/4, 100 per cent. | .. | $6\frac{1}{2}$ "      | ( <i>i.e.</i> , $3\frac{1}{4}$ inches on each panel) |
| 2S/2, d/3, 133 per cent. | .. | 8 "                   | ( <i>i.e.</i> , 4 inches on each panel)              |

In this connection attention may be drawn to the necessity of keeping the knives sharp. Maximum production cannot be obtained with blunt knives.

#### HEIGHT OF CUT

It is well known that the yield of seedling trees increases markedly as the height of the cut decreases. Where tapping

is on a single half spiral cut with a change of panel every 6 or 12 months, this fact can be utilized by tapping the lower panel of every tree irrespective of the normal change-over. This practice will inevitably lead to a period of reduced crops in later years when all the higher cuts come to be tapped, but this is a small price to pay for the satisfaction of maximum output in the present emergency.

#### UNPRODUCTIVE TREES

On every old estate which has not been rigidly and recently thinned there is a certain proportion of trees which are out of tapping on account of Brown Bast, temporary dryness or thin bark. Lazy and unambitious tappers will be content for these trees to be permanently out of commission and will, unless carefully supervised, add to their number. Every effort should be made to bring such trees back into tapping even at the expense of making wounds on trees which are difficult to tap on account of irregularities in the panel. It would, however, be unsound to allow tappers to waste time on trees with a negligible yield at the expense of earlier and more careful tapping of productive trees.

Where the bark of any panel is too thin to be tapped at normal levels it is suggested that a new cut should be opened at the maximum height at which the tapper can operate without a ladder. With the Michie-Golledge knife this is about 40 inches for a man of average stature on flat ground. The bark at this height will usually be virgin and of adequate thickness. In the case of a double-cut system, trees with thin bark on one panel can thus be tapped on both sides, but if the bark at normal levels is untappable on both sides then the new high cut should be tapped on one side only, *i.e.*, no tree should be tapped with two high cuts.

#### SCRAP

When crops were restricted the poorer grades of scrap were usually left on the trees or on the ground, but in present circumstances all grades should be collected. As an indication of the quantity of scrap that can be harvested if adequate payment is made, the following figures relating to the last three years' crop at Dartonfield may be of interest. The tapping system over most of the estate is 2S/2, d/4, 100 per cent.

|                           |    |         |
|---------------------------|----|---------|
| Average yield per acre..  | .. | 529 lb. |
| " scrap " " ..            | .. | 67 "    |
| " " as per cent. of total | .. | 12.6    |

#### SIZE AND ALLOCATION OF TAPPERS' TASKS

Within limits the yield per acre varies inversely with the size of the tapping task. A measure of the increase in crop obtainable by reducing the task was made in a series of experiments

by Mr. A. H. Healey and published in the First Quarterly Circular for 1940, page 19. The full task consisted of 180 trees tapped on the Double-Four system (2S/2, d/4, 100 per cent.) on flat land. It was estimated that by reducing the size of the task by 30 per cent. *i.e.*, to 126 trees, the annual crop would be increased by 6.7 per cent.

Unfortunately a decrease in the size of the tapper's task automatically involves an increase in the number of tappers (if the system remains unaltered) and extra tappers may not be obtainable. Where tapping is on a single cut system this difficulty may be circumvented by changing to a double-cut system. For example, a task of 200 trees on S/2, d/2, 100 per cent. may be changed to 100 trees on 2S/2, d/4, 100 per cent. without any alteration in the tapping force. The latter, although consisting of the same number of cuts, will be tapped in less time than the former, and a higher intake due to an earlier average time of tapping may be confidently anticipated. In the S.-W. Monsoon, when partial wash-outs are frequent, more latex can be collected in a scramble from 100 trees with two cuts each than from 200 trees with one cut.

In tapping experiments in the wet zone the Double-Four system (2S/2, d/4, 100 per cent.) has consistently given slightly higher yields than half spiral alternate day tapping (S/2, d/2, 100 per cent.), but it is not suited to the drier localities.

A further legitimate method of increasing yields is to allocate the best tappers to the highest yielding tasks. An example of the advantage to be gained by thus disposing the tappers is given below. Consider two tasks X and Y and two tappers A and B. When tapped by the better tapper A, task X gives 12 lb. and task Y 6 lb. Tapper B is only able to harvest two-thirds the crop that can be obtained by A. The total yields obtained under the two alternative arrangements are given below, and it is seen that the first arrangement results in an increased crop of about 14 per cent.

|     | Task | Tapper | Yield | Task | Tapper | Yield | Total     |
|-----|------|--------|-------|------|--------|-------|-----------|
| (1) | X    | .. A   | .. 12 | .. Y | .. B   | .. 4  | .. 16 lb. |
| (2) | X    | .. B   | .. 8  | .. Y | .. A   | .. 6  | .. 14 ,,  |

#### ABSENTEE TAPPERS

It is, perhaps, elementary to point out that crop is lost unless extra tappers are available to fill tasks which would otherwise remain untapped in the occasional absence of regular tappers. The employment of substitute tappers is not favoured by some Superintendents as it increases the difficulty of maintaining a uniformly high standard to tapping, but in present circumstances extra crop is more important than a few wounds.

### REST DURING WINTERING PERIOD

At first sight an obvious method of increasing crops is to omit the usual period of rest during refoliation after the annual "winter". This practice, which is almost peculiar to Ceylon, was originally based on sound physiological considerations, but there are no experimental data relating to this country to show whether the total annual crop is thereby increased or decreased. In other countries the advantages of a rest are not considered to compensate for the loss of crop during this period, but in a normal season in Ceylon the yield appears to show a more marked decrease than elsewhere, probably because the wintering is more regular. In the absence of definite information the value of continuing to tap throughout the wintering period must remain a matter of opinion, and the view here expressed is that it would be inadvisable to add this burden to all the other measures designed to extract the maximum quantity of latex from the tree.

It is suggested, however, that the period of rest might be reduced to two or three weeks by continuing to tap about a week longer than usual, *i.e.*, until most of the trees are bare or starting to show new leaves. On physiological grounds the time at which tapping should be stopped is during *re*-foliation rather than *de*-foliation, and the impression has been gained that some estates stop tapping rather too early. In normal times an important consideration is the economics of collecting reduced crops, but in the present emergency it is the rubber itself which is of first importance even if it is expensive to collect. To some extent trees might receive individual treatment, *i.e.*, tapping of late-wintering trees might be continued longer than the rest and early winterers taken back into tapping before the remainder.

### YOUNG BUDDED AREAS

Although all budded areas should be brought into tapping as early as possible we do not encourage any departure from normal methods, nor is it considered advisable to tap trees before they have attained the minimum girth of 20 inches at a height of 36 inches from the union. The only modification of our standard recommendations of which we would approve is to tap areas with only, say, 60 per cent. of tappable trees as against the usual figure of 75 per cent.

### REPLANTING

In present circumstances it is both poor business and, in our opinion, a dereliction of national duty to cut out tappable trees for replanting unless they have been ruined for future yields by "slaughter" tapping. Taking the long view, the desirability of accelerating replanting programmes in Ceylon is

not diminished, and reserves, both of cash and planting material, should be built up against the day when work can be resumed. Reserves of planting material may take the form of stumped buddings which can be developed in nurseries and transplanted when about two years old from budding. An experiment at Dartonfield has shown that stumped buddings can be tapped nearly a year earlier than budded stumps planted at the same time, and it is believed that the method may be of considerable value in making up for time lost by the interruption of replanting programmes.

#### SUPERVISION

It is necessary to record our opinion that the success of the various measures suggested above is largely dependent on the maintenance of efficient supervision. The reduction of European Staffs consequent on military embodiment, and the restrictions imposed by petrol rationing, will render this difficult to achieve, and it can only be suggested that Superintendents should regard the supervision of tapping as the first call on their time even to the detriment of work in new clearings.

Research Laboratories,  
Dartonfield,  
Agalawatta.  
January, 1942.