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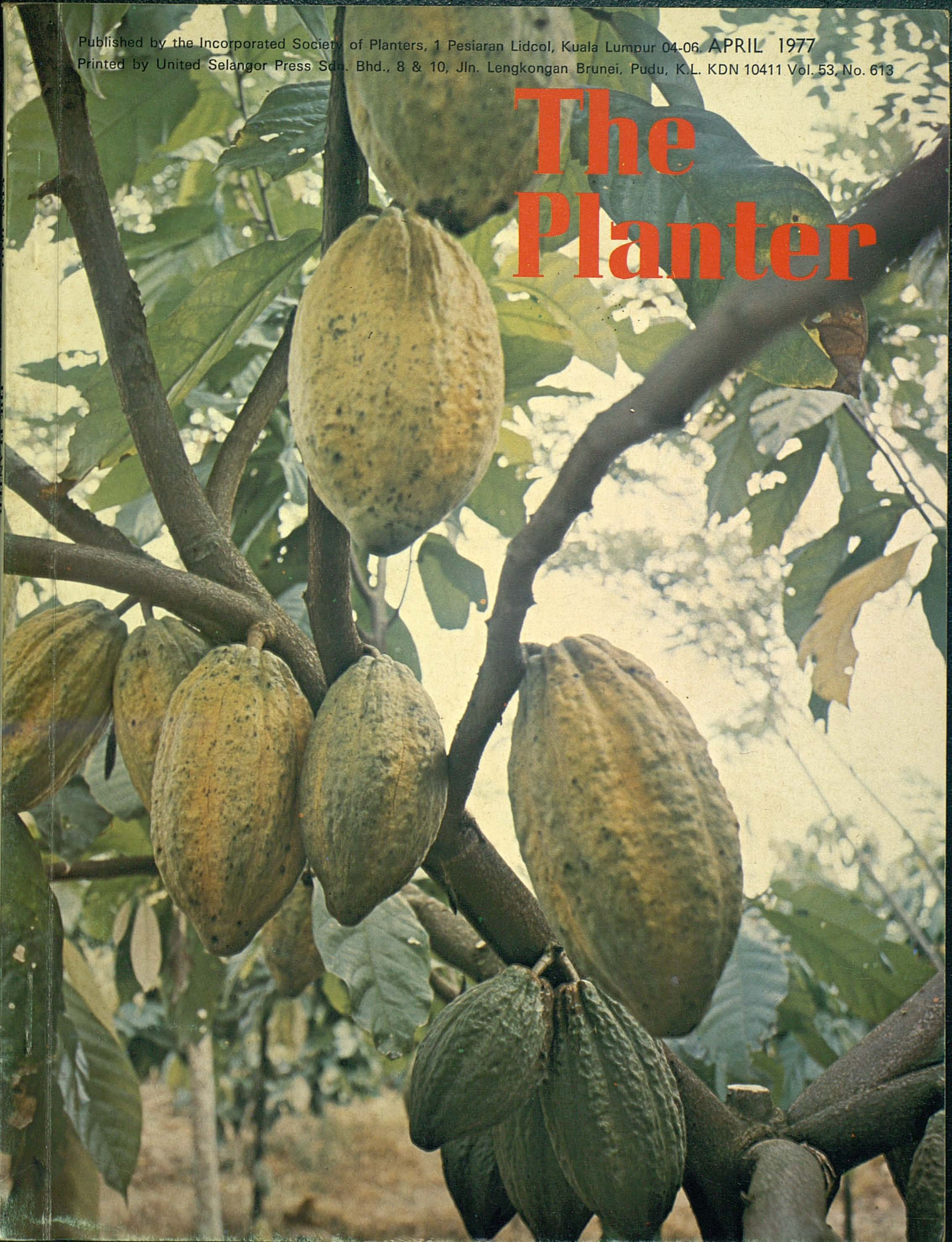
The Planter



The Planter

KDN 10411

MAGAZINE OF THE INCORPORATED SOCIETY OF PLANTERS

VOL. 53 APRIL 1977 No. 613

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The Incorporated Society of Planters

Founded 1919

THE SOCIETY REPRESENTS the Planters of Malaysia and other territories, whose personal and professional interests it is bound to endeavour to secure and promote.

OBJECTS foremost in the Society's Memorandum of Association are:

To promote the general interests of the planting profession.

To promote the advancement and facilitate the acquisition of that knowledge which constitutes the professional qualification of planter.

To watch over, promote and protect the mutual and individual interests of its members in respect of matters pertaining to or arising from their employment in the planting profession.

To promote and maintain good feeling, co-operation and understanding between members and their employers.

ACHIEVEMENTS of the Society are a technical education scheme, the publication of authoritative works on tropical agriculture, a monthly magazine featuring original technical articles, the sponsorship of conferences and symposia on tropical crops, and the organisation of joint consultation with employers.

MEMBERSHIP of the Society is open to:-

A Those directly employed in plantation management such as estate managers, assistant managers, superintendents, supervisors and cadets, and

B Executive engineers, estate medical officers, and qualified scientific or administrative staff of estates or organisations mainly concerned with the planting industry.
Category B may include those employed in such other senior executive, administrative, professional or advisory capacities as may be deemed by the Executive Council as being equivalent thereto.
Neither category shall include clerks, conductors, hospital assistants, etc.

ENTRANCE FEE for new and rejoining members is $10/- and must accompany application.

ANNUAL SUBSCRIPTION RATES* are as follows:-

	During the calendar year in which eligibility for membership occurred and the 4 succeeding calendar years.	Subsequently
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Ordinary Members employed as Managers, Assistant Managers etc. and normally resident in:		
Malaysia and Singapore	$48	$78
New Guinea and Brunei	$44	$60
Approved Overseas territories	$44	$44
Category B		
Ordinary Members employed as Executive Engineers, Estate Medical Officers, Research Staff etc., wherever resident	$48	$48

* Rates are proportionate for a part-year when joining.

Officers of the Society are listed opposite

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April 1977

The Planter

MAGAZINE OF THE INCORPORATED SOCIETY OF PLANTERS

(1) *The Planter* is published monthly from the Society's Office at 1, Pesiaran Lidcol, Kuala Lumpur 04-06, Malaysia.

(2) It features original technical articles in tropical agriculture, for the benefit of the planter (in active service or practice), papers relating to the Society's Technical Education Scheme, and other contributions of more general interest.

(3) The magazine's current print order is 2,200 copies and this is steadily rising.

(4) *The Planter* is read in some 51 countries*.

(5) Copies are exchanged with a wide range of agriculturally based institutions.

(6) Subscription copies go to 32 countries.

(7) Annual subscription is M$36, including postage by surface mail.

(8) Regular advertisers include national, regional and international organisations.

(9) Of particular interest to advertisers is the fact that the readership comprises largely executives and professional persons with considerable spending power.

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(Advertisement rates overleaf)

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Editorial :

TRIBUTE TO THE TORCH BEARERS!

In this centenary year of rubber planting in Malaysia, the Society is set to honour some of the 'torch bearers' of the industry, through recognition of their respective contributions to the diverse aspects of its development and progress.

Honours are being distributed equitably among all sides of such achievement, ranging from scientific research and technological innovation, industry associations and planting itself.

The recipients of the Society's honours, who would receive the F.I.S.P. award, are:

Tan Sri Dr B.C. Sekhar, Controller of Rubber Research and Chairman of the Malaysian Rubber Research and Development Board;

Tan Sri Sir Claude Fenner, Special Representative of the Rubber Growers' Association (and formerly was also the first Inspector-General of Police, Malaysia); and

Mr John McIntosh, the veteran planter who is Manager of the Prang Besar Estate (and one of our most active senior members).

The Society feels itself honoured in being able to make them "our own Fellows", on the basis of their respective contributions to the development and progress of the planting profession itself, and the planting industries.

The name of 'B.C.' is well known among scientific and technological circles connected with rubber, natural rubber especially. For, he represents in many ways the spirit of Malaysian science and technology – to smile, to strive and not to yield until success is attained.

'B.C.' not only has the highest honours which can come to a Malaysian rubber scientist but also one of the youngest among the international comity of scientists to claim such honours. It is no secret that 'B.C.' has been among the major motivators of many technological processes which have helped to find for our natural rubber the foremost place among natural grown elastomers in the world markets.

The Standard Malaysian Rubber (SMR) in particular can be regarded as among his 'brain children' . . . the benefit to the nation as a whole and to the rubber industry itself as a result of such innovative and even revolutionary thinking are there for all to see.

The name of 'Fenner' similarly rings the bell in many circles in Malaysia and abroad. Like 'B.C.', he has had a whole series of 'firsts' when being 'the youngest ever' -- including perhaps his current position as the Special Representative of the Rubber Growers' Association.

Being among the 'tallest' in the industry, he is also known for his great modesty -- this being demonstrated *inter alia* by his frequently squeezing his large frame into the confines of a 'Mini'.

The yeoman service rendered by Tan Sri Fenner (Sir Claude to his friends) to the

rubber industry, especially to its security and its state of health, may not be as well known to the outside world as to his friends and colleagues in the agro-based industries of Malaysia. Suffice it to say that Tan Sri Fenner has, within the short time of his appointment as the RGA Special Representative, endeared himself as the 'friend, philosopher and guide' to every sector of the industry, as regards any problem faced by its corporate sector or even personnel.

"How to say 'no' without being negative" . . . one has to learn this from stalwarts like Sir Claude who, in moments of utmost disagreement, is known to remain friendly, fair and accommodative. Needless to say that a complex industry like the Malaysian NR industry needs such sterling qualities in its leadership – now and ever.

Service far beyond the call of duty . . . this again is a pre-requisite which many aspire for, but only few possess. The name of John McIntosh is among the short honour roll of such persons, who have attained fame for their steadfastness to duty, come rain, hail or sunshine.

His contributions to make Prang Besar the focal point of many a planting innovation are many . . . above all, he provided great support to its research and development profile through strong, firm, yet friendly managerial prowess.

That the Society, in its 58th year, has been able to honour such stalwarts adds only stature and status to its own *espirit de corps*, and makes the honours themselves more honourable than ever before.

Through such awards, the Society has set its sights high, for the younger members to aspire and achieve. For, no professional Society can hope to rest on its past or current laurels and would have to make them only milestones in its efforts to motivate the further generations of up-and-coming 'torch bearers'.

In this spirit of challenge, and fulfilling its mission in history, the Society welcomes its new Fellows and looks forward to their further significant contributions in the service of the industry as well as the Nation itself.

Planter, Kuala Lumpur **53** : 143-156 (1977)

Considerations of density in *Hevea* plantations*

E C PAARDEKOOPER & W NEWALL

INTRODUCTION

In recent years recommended densities have tended to be lower or much higher than those currently planted. Those responsible for smallholder schemes, for example, are wondering whether the usual 8 x 2.5 m (500 per hectare) at planting is optimal.

The following considerations are set down because of the diversity of views on planting density *vis-a-vis* desired mature density (especially since nursery-advanced material is becoming increasingly popular), planting pattern, thinning and intercropping.

In considering the problem of the 'best' density it is useful to differentiate as follows:-

(a) *The optimum mature density.* This is the number of trees per hectare tappable from around the fourth to the tenth year of tapping (during the first three years, following current planting practices, part of the stand will not have reached tappability).

The optimum mature density, from a strictly commercial viewpoint, is that which gives the highest profit per hectare over the desired tapping life: in the commercial estate sector this optimum will normally be lower than the density which gives the highest yield, because while higher densities may give higher production, the tapping costs will go up. In smallholdings, whether individual or government-sponsored undertakings, the most profitable mature density will normally be that which gives the highest yield. It should be noted here that this highest-yielding density will almost certainly be different for every clone or seedling family; considerable inter-clonal difference (albeit between only two clones) was demonstrated by RRIM (1973) and Eschbach (1974).

(b) *The density at planting.* This will generally be higher than the 'mature density' to allow for losses and for possible thinning.

(c) *The planting pattern at a given density.* Cost of terracing, and intercropping considerations, mainly determine the degree to which one wishes to deviate from the 'equidistant' patterns.

THE TARGET FOR DENSITY DURING MATURITY

There have been a number of density experiments in the Rubber-growing countries whose results are applicable to our quest for the optimum mature density. Unfortunately, published data are often incomplete, clones used are out of date, and the comparison of

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*This paper is adapted from a UNDP/FAO Project Note written for the project *Strengthening Research on Rubber and Oil Palm in North Sumatra*, and was issued in its original form in June, 1976. At that time, the authors were respectively Team Leader and Smallholder Development Officer of the Project.

densities is sometimes confused by differences in planting pattern; experiments using more modern cultivars have had only a few years' tapping, and the relative yields of the treatments must be expected to change in time.

The marked differences in clonal reaction to density found in the new RRIM experiment (RRIM, 1973) and in the IRCA experiment (Eschbach, 1974) suggest that all new clones should be tested under at least three different densities, that is, as clone-cum-density trials. Other factors such as the use of advanced planting materials with their lower variability but higher initial cost, the relatively low variability of modern seedling families and perhaps even the possibilities of reducing variability by selection of root-stocks and of buds (Nozeran & Du Plessix, 1969) will influence the relation between density and yield and profitablity: these factors would generally favour lower densities, particularly for estates. On the other hand, new exploitation techniques (low frequency tapping with stimulation) which reduce tapping costs, would shift the economic optimum density in the higher direction.

Notwithstanding the shortcomings of the experimental data on the effect of extremes of density so far published, and the lack of statistics from commercial plantings, it can be deduced from the assembled data that:

- The lower the density, the better the health, development and yield per tree, the shorter the field immaturity, but the lower the yield per hectare.
- The higher the density, the poorer the health, development and yield of the tree, the higher the percentage of trees which will never reach tappability, and the more prolonged the field immaturity; but – up to a point – the higher the yield per hectare.

The reason why planting density is largely an economic problem is simple; it is because higher densities result in lower average girth, thinner bark, and therefore lower yield per tree per tapping; tapping costs go up, decreasing the profitability.

The point where the increased profits through increased production will counterbalance decreased profit per kg depends on the following factors:

- the relationship between density and yield per hectare
- the assumed relationship between density and task size
- the tapping costs, and the extent to which tappers' wages depend on production and selling price – the relative parts of the total tappers' emoluments which are fixed and which depend on production ('poundage') and SP (price bonus).
- the selling price of the rubber.

In the following paragraphs an effort is made to determine the effect of density on gross profit by means of a simple model.

The following expression for gross profit was originally developed for the evaluation of tapping systems. It was used by Barlow and Lim (1967) for the economic analysis of a density experiment:

$$p = Yf\,(Sf - Bf) + Yc\,(Sc - Bc) - \left(\frac{d.r}{t} \times W\right) \qquad (1)$$

For simplification, first and lower grade rubber can be combined into one quantity (Y) which is sold at an average price S. Furthermore, we define S as S-B, therefore we

deduct from the selling price all processing costs, taxes, etc., to give a nett selling price S, which *represents the value of the latex as it is received at the factory.*

The simplified formula becomes therefore:

$$p = Y.S - \frac{d.r}{t} \quad x \quad . \quad W \qquad (2)$$

in which

p = gross profit in Rp per hectare (gross because costs which are constant per hectare have not been deducted)

Y = average yield kg/ha

S = average nett price of rubber, Rp per kg

d = density (tapped trees per hectare)

r = number of tappings per year

t = task size

W = cost of tappers (Rp per man-day)

Note that overhead costs do not have to be taken into account. The argument that higher yield per hectare will lower the overhead cost, is not correct; these overhead costs (including upkeep, fertilizer etc.) are taken as constant per hectare; they are therefore not affected by changes in production but simply deducted from the gross profit per hectare to obtain the nett profit.

The gross profit depends therefore on six variables, one of which is the density (d). Since the expected yield (Y) and the assumed task size (t) both vary with the density (d), we will compare different densities with a reference (standard) density D_r; therefore $d = x.D_r$, in which *x is the density under consideration (relative density) in relation to the reference density.*

The yield Y can now be considered as the product of two factors: the yield Y_r which is obtained at density D_r, and a *factor "a" which represents the relative difference in yield as a result of difference in stands of trees in tapping. Therefore* $Y = a.Y_r$

In exactly the same way, tapping task size (t) is the product of the task size T_r which is assumed at standard density D_r, and *a factor "b" which represents the relative difference in task size as a result of a difference in density. Therefore* $t = b.T_r$

Substitution in (2) gives

$$p = a.Y_r.S - \frac{x.Dr._r}{b.T_r} \quad . \quad W \qquad (3)$$

The problem now is to determine a and b : how does yield per hectare relate to the density and what task sizes should be assumed for different relative densities? The first question can be answered only by density experiments.

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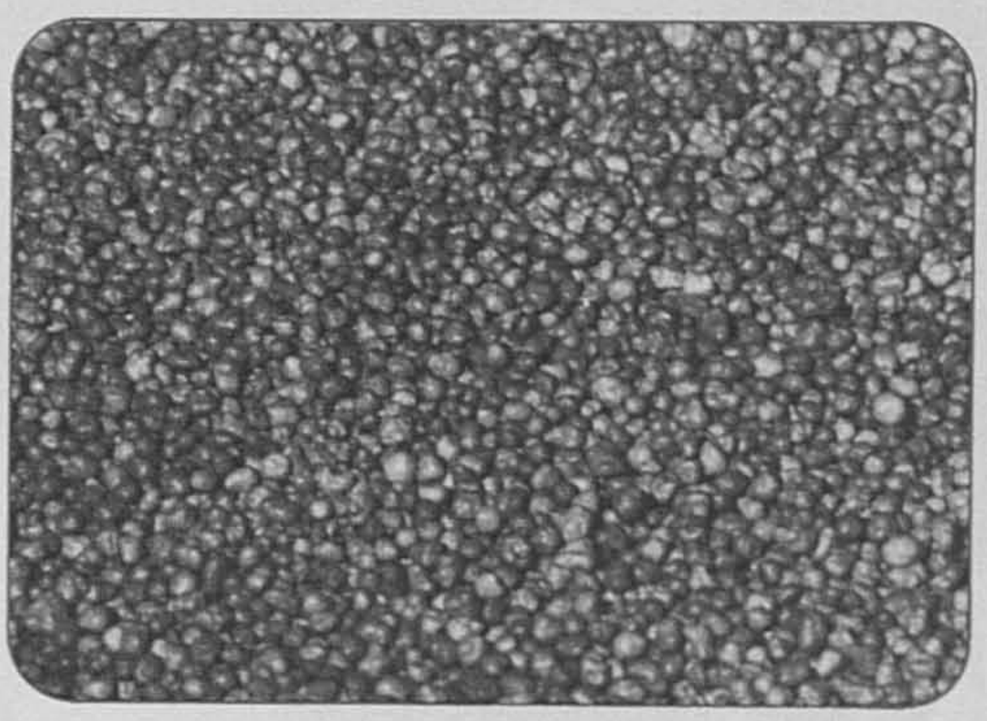

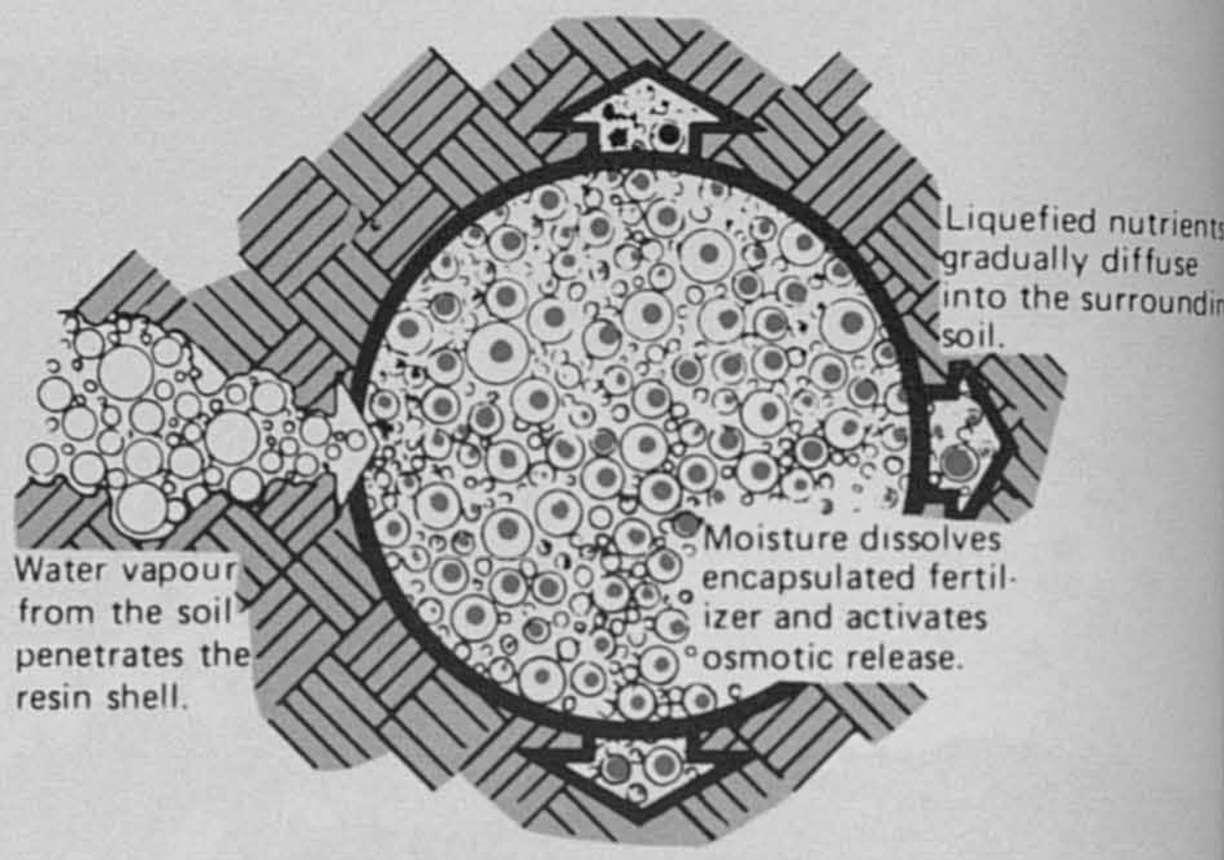

How Osmocote works

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If the yield per hectare is plotted against the density, curves are obtained which show that the increase in yield per hectare diminishes as the density increases. The 'law of diminishing returns' in relation to higher densities is clear from the figures published by, for example, Westgarth & Buttery (1965). Doubling the planting density from 267 to 548 trees per hectare produced 18% more yield, and a further doubling from 548 to 1075 trees produced only 9% more yield (partly because at the highest density, about 35% of the trees never reached tappability).

If, however, the tapped density and yield are plotted on double logarithmic paper, the regressions become close to linear; this is shown in *Figure 1* for the data of Barlow & Lim (1967), and of Mainstone (1973). The yield data from Remy (1970) result in similar straight lines, and the same is found for that of Eschbach (1974) after adjustment for the untapped trees. In all these cases, yield is taken as the average yield over the years for which data were available, while the density refers to the number of trees actually tapped. Unfortunately, it was not possible to take the results of the interesting 'Marchal' experiment conducted in Cambodia into consideration, as the reports on this experiment in the Annual Reports of IRCC never show the stand actually tapped.

The straight lines in *Figure 1* suggest that the relationship between percentage of trees tapped and yield per hectare (both averaged over a number of years) can be represented by the model $\log a = m \log x$ or $a = x^m$, in which x is the relative change in density over the 'reference density' and a the relative change in yield over the yield obtained at the reference density. The regression coefficient m indicates the slope of the line.

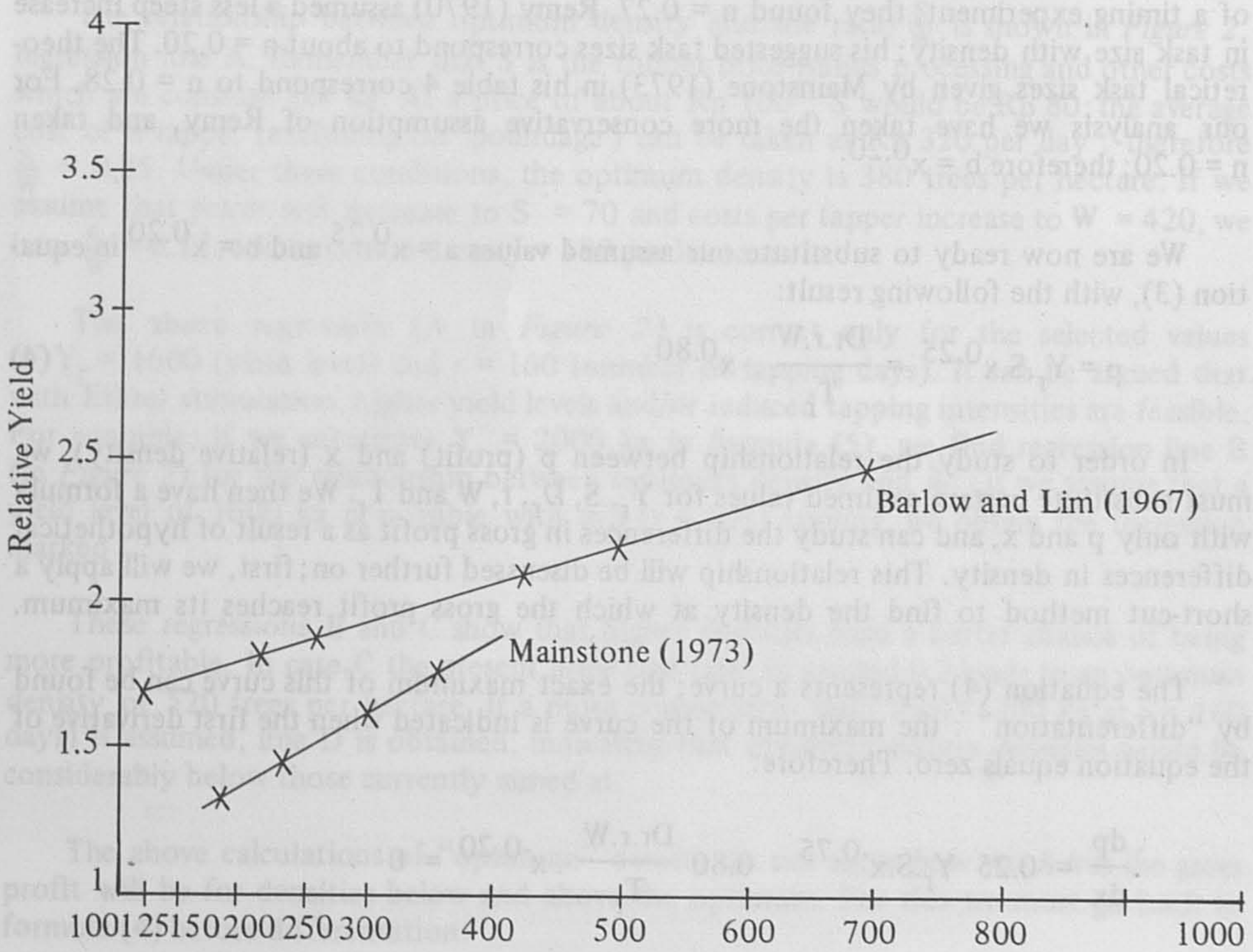

Figure 1

Note that for m = 1, the yield would increase proportionately with density, therefore yield per tree would be constant; obviously this would be correct only at very low densities when trees do not compete. At densities higher than around 1000 tapped trees, when no further increases in yield per hectare can be expected, m approaches zero. *However, within the region of practical interest, m appears fairly constant.*

The data of the RRIM experiment suggest a regression coefficient m = 0.21; in the Vietnam Marchal experiment, the increase in yield with increased density appears more pronounced (m = 0.30); the data published by Mainstone (mean first five years) suggest m = 0.25. We will assume for this analysis that m = 0.25. This implies that for each 10% increase in 'tapped' density, the yield per hectare is assumed to go up by approx. 2.5%, and consequently the yield per tree to go down by approx. 6.8%.

Having found $x^{0.25}$ as an estimate for factor a, we now turn to factor b : what is the relationship between density and task size? It is obvious that at higher densities, task sizes (in number of trees) can be made larger, because tappers have smaller walking distances between the trees. On the other hand, task sizes cannot be assumed to increase proportionately with tapped density (in other words, being of a constant area). The increases in densities are therefore only partly reflected in increase in task-size. This suggests a model similar to that for the density-yield-relationship;

$$\text{task size} = Kx^n$$

Barlow and Lim (1967) assumed just such a relationship based on the results of a timing experiment; they found n = 0.27. Remy (1970) assumed a less steep increase in task size with density; his suggested task sizes correspond to about n = 0.20. The theoretical task sizes given by Mainstone (1973) in his table 4 correspond to n = 0.28. For our analysis we have taken the more conservative assumption of Remy, and taken n = 0.20; therefore $b = x^{0.20}$.

We are now ready to substitute our assumed values $a = x^{0.25}$ and $b = x^{0.20}$ in equation (3), with the following result:

$$p = Y_r.S.x^{0.25} = \frac{Dr.r.W}{T_r} \cdot x^{0.80} \qquad (4)$$

In order to study the relationship between p (profit) and x (relative density), we must substitute certain assumed values for Y_r, S, D_r, r, W and T_r. We then have a formula with only p and x, and can study the differences in gross profit as a result of hypothetical differences in density. This relationship will be discussed further on; first, we will apply a short-cut method to find the density at which the gross profit reaches its maximum.

The equation (4) represents a curve; the exact maximum of this curve can be found by "differentation" : the maximum of the curve is indicated when the first derivative of the equation equals zero. Therefore:

$$\frac{dp}{dx} = 0.25\ Y_r.S.x^{-0.75} - 0.80\ \frac{Dr.r.W}{T_r} \cdot x^{-0.20} = 0$$

$$\text{or} \qquad x^{0.55} = \frac{Yr.S.Tr}{3.20\ Dr.r.W} \qquad (5)$$

This formula allows us to calculate the density $x.D_r$ at which the profit is maximal. Let us now assume the following values : at D_r = 400 tapped trees per hectare, the expected average yield level is 1600 kg, with 160 tapping days per year. The average task size at 400/ha is 500 trees.

Substitution in (5) gives:

$$x^{0.55} = 3.91 \frac{S}{W} \quad \text{or} \quad x = 11.94 \left(\frac{S}{W}\right)^{1.82}$$

Since the optimum density d is in fact $x.D_r$ in which D_r was taken as 400, we find:

$$\text{optimum density} = 4776 \left(\frac{S}{W}\right)^{1.82} \qquad (6)$$

Therefore, the *optimum density depends only on the ratio of nett price of rubber to cost per tapper per day.* Higher cost and/or lower price will result in a lower optimum density, and vice versa.

For ease of calculation, we can write (6) as a linear regression:

$$\log (\text{optimum density}) = \log 4476 + 1.82 \log \left(\frac{S}{W}\right)$$

The relationship between optimum density and the ratio $\frac{S}{W}$ is shown in *Figure 2,* regression line A. Remember that S is the rubber price minus processing and other costs which are constant per kg. At a price of about Rp 100[1], S would be Rp 80; the average cost of a tapper (excluding his 'poundage') can be taken as Rp 320 per day : therefore $\frac{S}{W}$ = 0.25. Under these conditions, the optimum density is 380 trees per hectare. If we assume that prices will decrease to S = 70 and costs per tapper increase to W = 420, we have $\frac{S}{W}$ = 0.17, and optimum density = 180 per hectare etc.

The above regression (A in *Figure 2*) is correct only for the selected values of Y_r = 1600 (yield level) and r = 160 (number of tapping days). It can be argued that with Ethrel stimulation, higher yield levels and/or reduced tapping intensities are feasible. For example, if we substitute Y_r = 2000 kg in formula (5), we find regression line B (in *Figure 2*) for the relationship between optimum density and $\frac{S}{W}$; if we assume that a yield level of 1600 kg is possible with d/3 (r = 107) tapping, we obtain the regression marked C.

These regressions B and C show that higher densities have a better chance of being more profitable. In case C the present price cost ratio of around 0.2 leads to an optimum density of 520 trees per hectare. If a more conservative yield level (1200 kg at r = 160 days) is assumed, line D is obtained, indicating that optimum mature densities would be considerably below those currently aimed at.

The above calculations of "optimum" density do not show *how much less* the gross profit will be for densities below and above the optimum. For this we must go back to formula (4) before differentation:

---

[1]Costings remain as originally written, in Indonesian Rupiahs, as they are only incidental to the argument; but it may help the reader to know that Rp 415 = US$1.00.

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$$p = Y_r S.\, x^{0.25} - \frac{D_r.r.W}{T_r}\, .x^{0.80}$$

Substituting our assumed constants of case A *(Figure 2)*, we find:

$$p = 1600\, S.x^{0.25} - 128\, W.x^{0.80} \qquad (7)$$

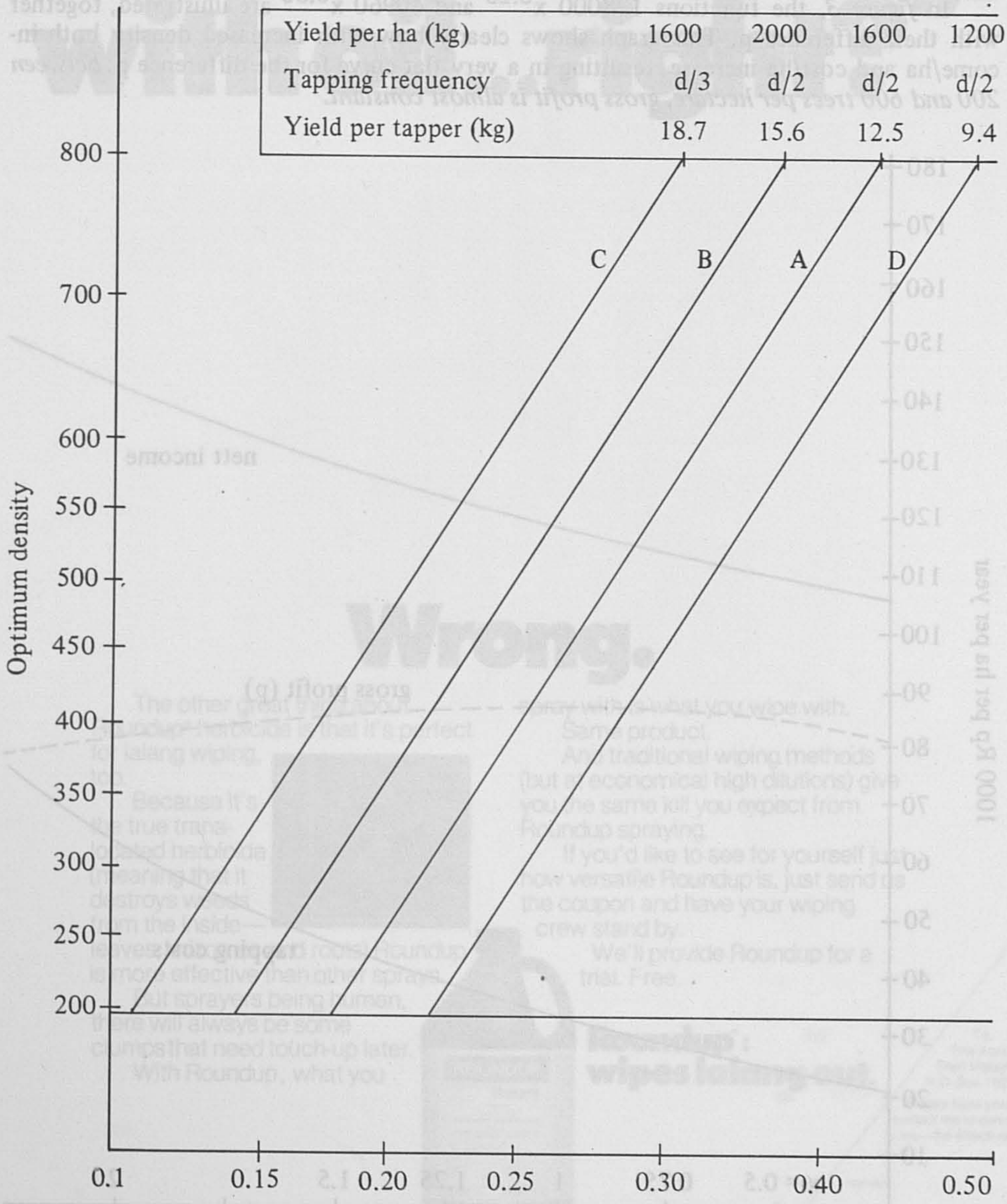

Figure 2

This formula shows clearly how the gross profit per hectare is obtained as the difference between two functions of x; the first function represents nett income, the second the cost per hectare. As x increases, the value of both functions will increase; it depends however on S and W what will happen to p (the difference). Under present conditions, realistic values are : S = Rp 80 and W = Rp 320. This gives us

$$p = 128000\, x^{0.25} - 40960\, x^{0.80}$$

In *figure 3,* the functions $128000\, x^{0.25}$ and $40960\, x^{0.80}$ are illustrated, together with their difference p. This graph shows clearly how with increased density both income/ha and cost/ha increase, resulting in a very flat curve for the difference p; *between 200 and 600 trees per hectare, gross profit is almost constant.*

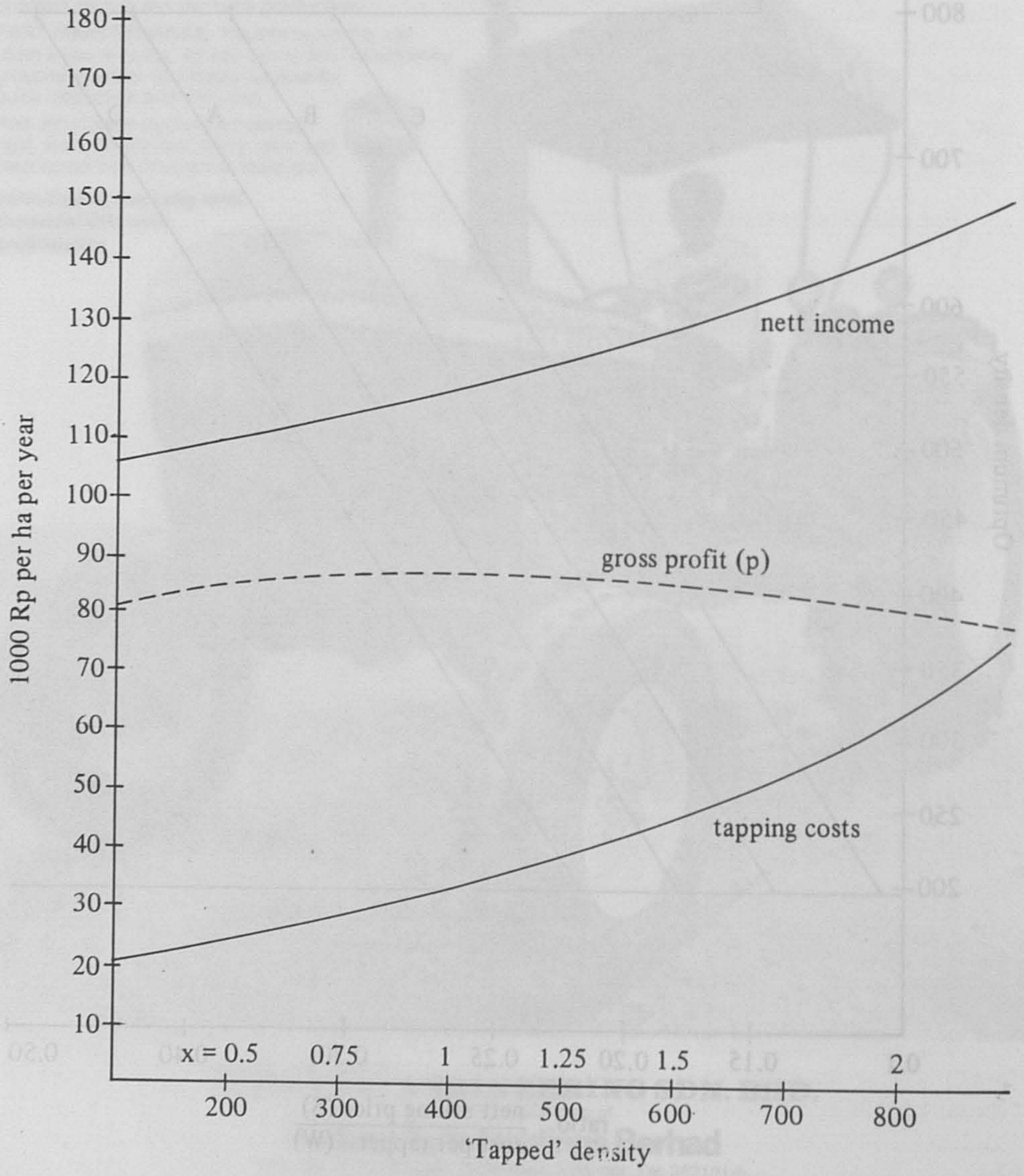

Figure 3

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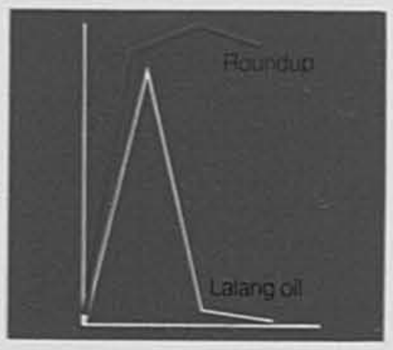

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Address/Phone: .....

.....

.....

Size of plantation: .....

Crop: Young rubber ☐ Mature rubber ☐ Young oil palm ☐ Mature oil palm ☐
Principal weed: Lalang ☐ Ottochloa nodosa ☐ Paspalum conjugatum. ☐

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3

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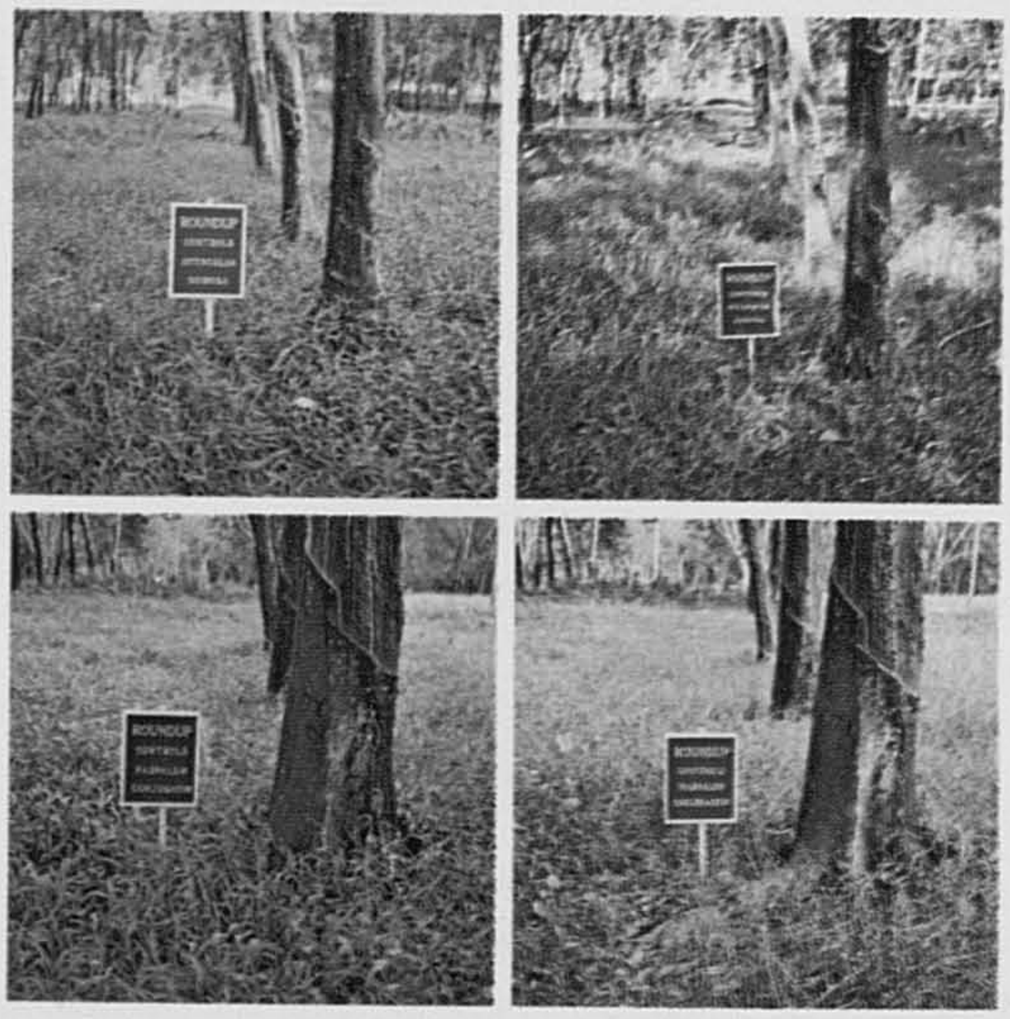

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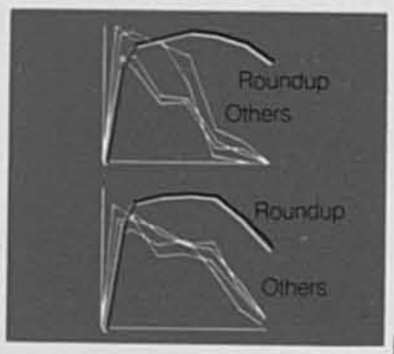
And here you see 2 test plots heavily infested with Ottochloa nodosa and Paspalum conjugatum first before and then 6 months after spraying with Roundup® herbicide at an economical high dilution.



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Crop: Young rubber ☐ Mature rubber ☐ Young oil palm ☐ Mature oil palm ☐
Principal weed: Lalang ☐ Ottochloa nodosa ☐ Paspalum conjugatum. ☐

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Formula (5) can also be used to determine whether in a given case on an estate the density is optimum. If the 'reference' density is in fact optimum, x will equal 1, and Formula (5) will become:

$$Y_r.S.T_r = 3.20\, D_r.\, 2.\, W$$

$$\text{or} \quad S = \frac{3.20\ D_r.2.W}{Y_r\ .T_r}$$

Now, since $D_r.2$ is the number of tappers employed per hectare,

and since $\frac{W}{\text{yield per tapper}}$ is the tapping cost *per kg*, we get

$$S = 3.20 \times \text{tapping cost } \textit{per kg}. \qquad (8)$$

Therefore tapping costs (in Rp per kg) are about 30% of the nett selling price (in Rp per kg).

This 'rule of thumb' is rather convenient since estate accounts usually give a figure for the tappings costs per kg. The only snag is that our 'selling price' S, is the rubber price from which *fixed* costs per kg are deducted : processing, tax, transport. *If the tapping costs (in Rp per kg) are more than 30% of the nett price (after deducting processing etc.), lower densities will increase the profit per hectare, and vice versa.* This simple rule is based only on the assumed values m = 0.25 and n = 0.20, which represent the rate of increase in yield and task size with increase in density.

As shown in *Figure 3,* the difference in profitability relative to density is negligible, and under estate conditions agronomic considerations appear to be more important than economic ones in deciding on the optimum density. Only under certain conditions (relatively low tapping cost for instance through low frequency tapping-cum-stimulation and/or high rubber prices) would densities of more than 400 tapped trees result in an appreciable extra profit. There are however three economic arguments against high densities which were not brought out by our simple model:

(a) the model assumed that the constant costs per hectare are not affected by density. In fact, higher densities will result in higher costs per hectare such as for planting material and manuring.

(b) the model is based on the relationship between yield and *tapped* trees per hectare. All density experiments have shown that in order to obtain a high 'tapped' density, the *planted* density should be progressively higher. In the RRIM experiment, at 1000 planted trees per hectare about 35% never became tappable; in the IRCA trial of the 800 trees planted per hectare only 460 and 540 were actually tappable in the fifth year of tapping, in PB 86 and PR 107 respectively. This would appear to put the maximum possible stand of tapped trees at around 650 trees per hectare.

(c) at higher densities growth is slower, and prolongs the period of immaturity; this has a direct bearing on the total profitability of an estate.

All things considered, there appears to be no economic justification, under estate conditions, for densities above about 400 tapped trees per hectare.

On the other hand, the suggestion by Mainstone (1973) that lower-than-standard densities would result in higher profits does not seem justified.

The above considerations of maximum profitability, which lead to a suggested mature density of 400 trees per hectare, apply to the commercial estate sector. Under smallholder conditions where one is simply interested in the highest possible yield per hectare over the total tapping life of the tree, higher densities will be more profitable, and the optimum mature density will vary with the clone. In the IRCA experiment, maximum yield in the fourth/fifth year appears to be reached at a *planted* density of 650 trees for PB 86 and 550-600 trees for PR 107.

In the new RRIM experiment, the highest yield over the first three years of tapping were given at 741 planted trees for RRIM 600, and 557 planted trees for RRIM 701. In both experiments the stands actually tapped were lower.

Within the smallholder sector, distinction should be made between the individual small farmer situation and the Government-sponsored 'estate type' of development scheme. The individual smallholder will want maximum yield over a long tapping life, say 35 to 40 years. Whereas the government-sponsored plantation ('scheme', nucleus estate, etc.) is likely to aim at a balance between profitability and maximum labour intensiveness, perhaps with a shorter replanting cycle.

In that the independent smallholder will certainly need good renewed bark, he cannot afford to aim at a mature density much above 500 trees/ha. But densities of 600-650, to be exploited on virgin bark only with low-frequency tapping + stimulation and below-average task-sizes throughout, might well be the best investment for the government-sponsored plantation.

The use of nursery-advanced planting material (of both buddings and seedlings) would make somewhat lower densities attractive, and some further comments on this topic may be helpful.

There is much to be said for high-stumped material in a management-shortage situation, because management can be concentrated on the nursery for the first 1-2 years of the tree's life. During this time, there should be sufficient opportunity for training field staff and labour in the transplanting techniques.

The foregoing considerations tacitly refer to clones, and in fact all recent work on density has related to clones, although there is not enough information on all currently recommended clones under comparable environmental conditions.

It has always been the practice to plant seedlings more densely than clones, on account of their heterogeneity in growth and yield, and therefore to allow for thinning based on test-tapping and for the generally lower average yield per tree. Although the newer seedlings are progressively improving in uniformity and yield, it would still be recommended to aim at a mature density 10-15% higher than one would choose for clones, to compensate in terms of yield per hectare.

It is interesting to note that in the first ten years' tapping, according to Malaysian commercial field records published by the RRIM (1974), GG 1 seedlings yielded 93% of the GT 1 buddings, although relative average tapping stands were not published.

It is also interesting to note that clones do not have it all their own way in terms of homogeneity, since:

(a) Combe (1975) has demonstrated that there is a considerable fluctuation in the coefficient of variation of girth among clones, and

(b) Eschbach (1974) has demonstrated that there is a great difference in toleration of higher densities between PB 86 and PR 107.

Therefore, in the light of the vigour of the new seedlings, and presuming that they are selected for vigour at the germinating-bed and nursery or polybag stage, this planting material should become increasingly competitive with clones.

To summarize with a generalization, the commercial sector should aim at an optimum stand and maximum profitability per tapper; the government sector should aim at the maximum agronomically feasible yield per hectare in order to create maximum employment opportunities and generate foreign exchange revenue.

DENSITY AT PLANTING

Generally speaking, the initial density at planting will need to be higher than the desired mature density; on the one hand, one must insure against losses through root disease, wind-damage etc., and on the other, a limited reduction of the period of immaturity is possible by thinning out of the poorest trees during immaturity.

With the use of advanced planting material, selection can be made at the nursery stage, and there should be no need for thinning in the field. Only if losses are less than expected, may some thinning be necessary, around twelve months before the tappability criterion is reached.

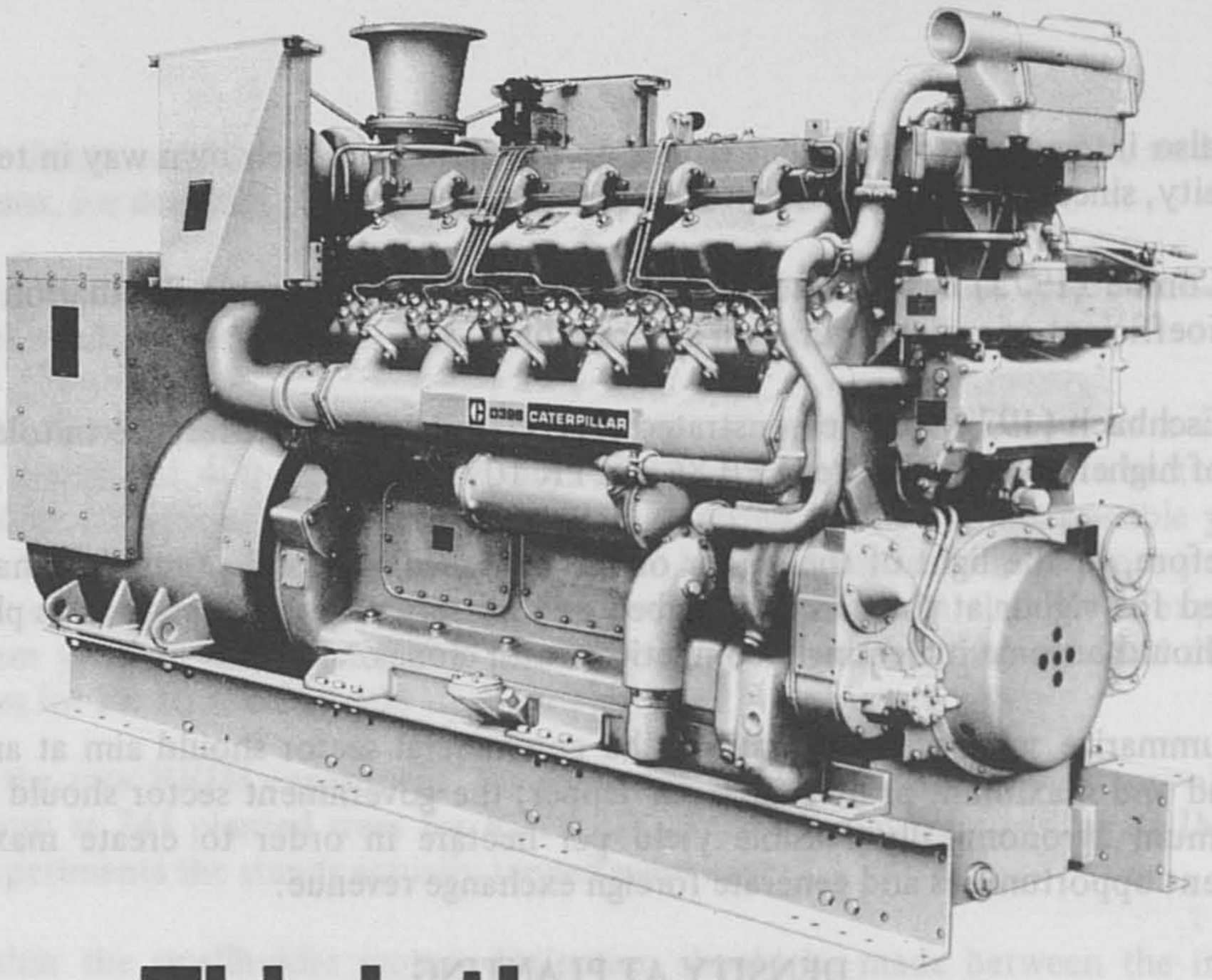
The weight of these arguments depends mainly on the quality of management. If proper techniques of planting, upkeep and root disease control are followed, losses during field immaturity should be below 10%. Also, good planting with advanced material will result in a very even stand, and the effect of thinning on average girth would be minimal. Aiming at a mature density of 400 trees per hectare, there would be little point in planting more than 10% above that density.

If more losses and less uniform growth are expected, the percentage extra trees could be increased to a maximum 25%, giving a density at planting of around 500 per hectare, to be thinned to 400 trees in two stages before the fifth year from planting out.

PLANTING PATTERN

It is assumed that an equidistant planting pattern provides the optimum conditions for growth, as each tree has the same amount of space: the hypothesis that avenue planting would provide a larger assimilation area has never been demonstrated satisfactorily. From this, it can be inferred that the higher the density, the more desirable it will be to plant equidistant.

Napitupulu (1976) has offered interesting arguments for the opposite conclusion: at high densities 'equidistant' planting would result in severe selfpruning, tall trees with small crowns, while 'avenue' planting – even though inter-tree distances in the row are



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shorter – would allow space for permanent branching in the direction of the interrow. While it is questionable that the larger canopy would compensate for the increased competition within the row, this argument needs to be settled by careful study of the available data in the literature and perhaps experimentation.

There are two situations in which a moderate rectangular pattern might be advantageous : when terracing is required on sloping land and when intercropping is planned as in smallholder schemes.

With regard to intercropping, it should be carefully considered whether the economic advantage of three years intercropping – only possible with rather extreme rectangular planting – outweighs the disadvantage of an increase in the period of immaturity.

There is a lack of information on the economics of intercropping between avenue plantings with an expected field immaturity of at least five years, compared with an equidistant planting of high-stumped material, with reduced or no intercropping and a field immaturity perhaps as short as three years (Sivanadyan, Haridas & Pushparajah, 1975).

Early arguments for intercropping were based on compensating a smallholder during the first three years of an expected 6-8 years field immaturity of his replant. This of course meant planting at 2.5m x 7 or 8m and doubling the fertilizer input requirement for three years. It is at least arguable that an equidistant, or nearer equidistant planting with say one year's intercrop would produce better-developed trees with a shorter field immaturity and which would outweigh the advantages of three years' intercrop in an avenue planting. After all, the trees have got to last about forty years, and one questions the prudence of jeopardizing their future wellbeing for the sake of three years' intercrop income, especially when the smallholder would still be income-less for another 3-5 years.

The possibilities afforded by high-stumped material make the economics look even more dubious.

It has been well demonstrated in many trials that the inter-tree distance should not be less than 2.5 metres; if therefore it is decided to maximise intercropping capability by maximising the width of the interrow, the interrow distance appropriate to the selected planting density is calculated by the formula:

$$\frac{10\,000 \div \text{inter-tree distance}}{\text{Desired density}}$$

e.g. if the inter-tree distance is 2.5m and the desired density is 500/ha, the formula becomes $\frac{4\,000}{500} = 8\text{m}.$

Whatever the pattern on unterraced land, it is normal to use an inter-tree distance of 2.5m in terraced planting for economy in the cost of terracing; inter-terrace intercropping is of course never recommended, because of the risk of soil erosion.

Nevertheless, it remains to be demonstrated that such economy in terracing costs is not outweighed by shorter immaturity if a more equidistant pattern is employed, i.e. with more terracing and a wider inter-tree distance. On the other hand, as sloping ground provides a greater soil surface per map-hectare (increasing with steepness), the flat land

planting pattern applied to a hill-side will result in a denser stand. For example, a slope of 30° from the horizontal will give 15% more surface area and therefore more planting points than the same map area of unterraced ground. In such a case, to preserve the planting density at flat-ground level, one could opt for improved growth conditions by increasing the inter-tree distance by 15%, or greater economy in terracing by increasing the inter-terrace distance by 15%.

In the absence of intercropping on unterraced land, best growth conditions are probably obtained by equidistant planting (see Appendix). If linear planting is preferred on the grounds of economy in upkeep (again a questionable benefit), a minimum inter-tree distance of 3 metres is recommended.

A NOTE ON FUTURE CLONE TRIALS AND DENSITY EXPERIMENTS

The authors feel that trials whose primary purpose is to test cultivar reactions to, and/or the economics of, a particular planting density or densities, should preferably be planted equidistant. If such trials are planted in a linear pattern, the inter-tree distance will be less than that of the interrow, and to that extent corrupt the findings relating to density *per se*.

Needless to say, all normal density trials should be planted on land which does not call for terracing. It would be interesting, however, to test the economics of equidistant planting on terraced land vis-a-vis the usually recommended 'economy' measure of minimising inter-tree distance on terraces so as also to minimise the cost of terracing. Such a trial would test the *same* density at equidistant planting and a variety of inter-tree : interrow plantings; it would therefore be necessary to calculate a correcting factor for the degree of slope.

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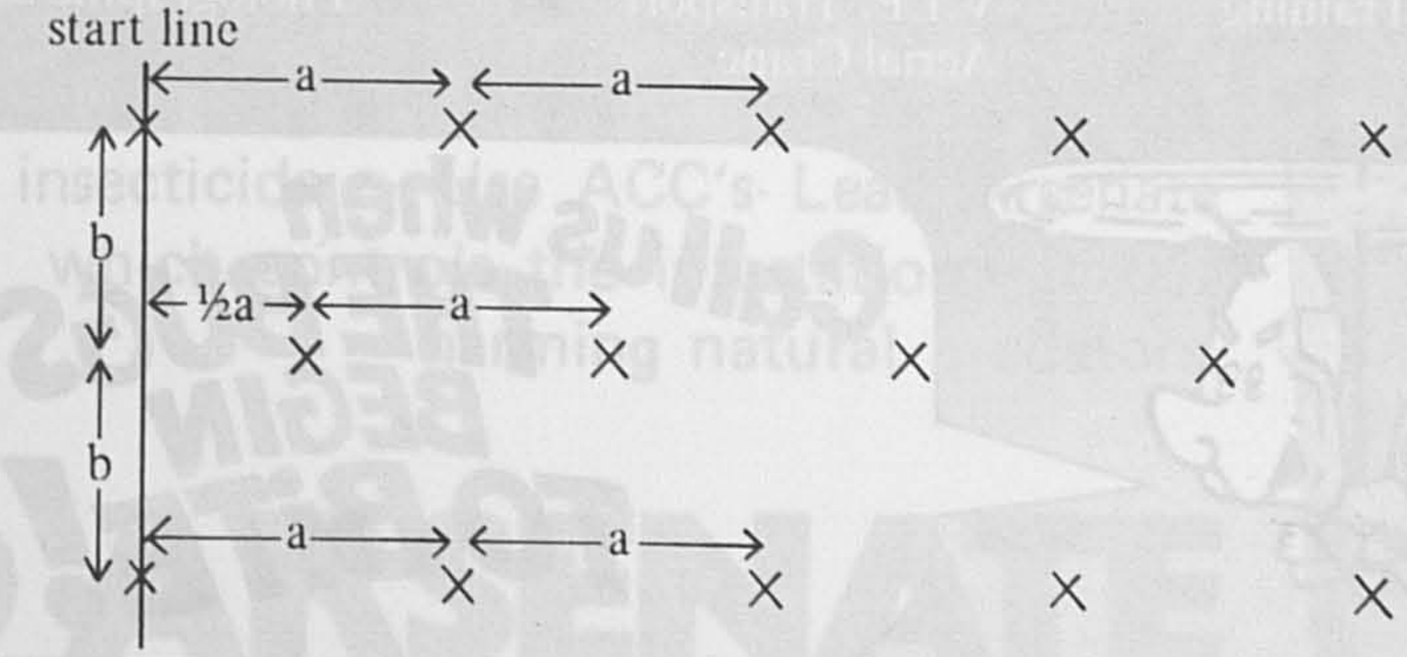
APPENDIX

PLANTING DISTANCES AND DENSITIES FOR EQUIDISTANT PLANTING

Inter[a]-tree distance (metres)	Inter[b]-row distance (metres)	Stand per hectare
6.20	5.39	299
6.00	5.22	319
5.80	5.05	341
5.60	4.87	366
5.50	4.79	379
5.40	4.70	394
5.30	4.61	409
5.20	4.52	425
5.10	4.44	441
5.00	4.35	460
4.90	4.26	479
4.80	4.18	498
4.70	4.09	520
4.60	4.00	543
4.50	3.92	566
4.40	3.83	593
4.30	3.74	621
4.20	3.65	652



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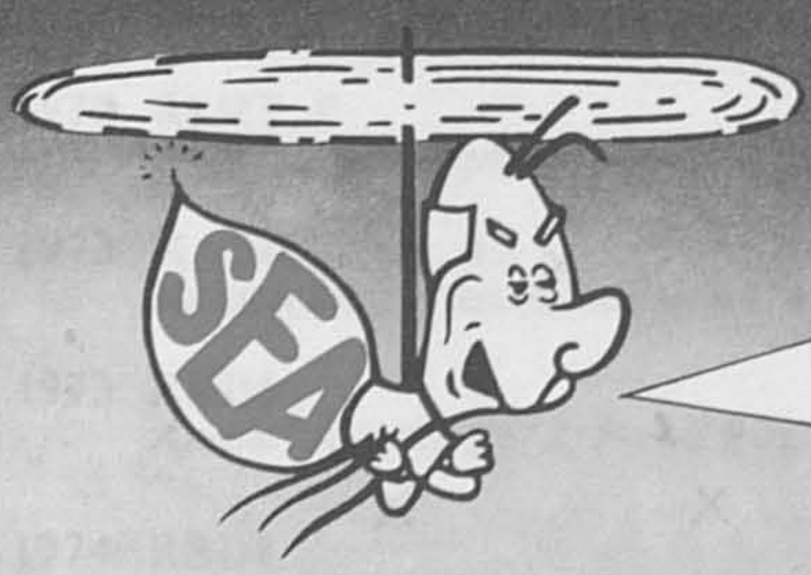

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Malaysia - planting through the decades - II

H.V. SPELDEWINDE, PPT., PJK.

(The first part of this communication, which appeared in the November 1976 issue of **The Planter,** *reviewed the progress of rubber and oil palm planting in Peninsular Malaysia after a general survey of the planting scene. The second and last part contained herein turns the spotlight on to other crops of significance, including padi, coconut, cocoa, tea, coffee, soya bean and pineapple. (Editor).*

Padi

Botanical Name – Oryza sativa *Family – Graminae*

History

In Peninsular Malaysia, nearly one million acres of land are under padi, which is a crop of importance next to rubber and oil palm in the land-use pattern of the country.

About 20% of the economically active population in the Peninsular are engaged in padi growing, which is exclusively confined to smallholdings averaging 3-5 ac. During the last decade, there has hardly been any increase in the total physical area of land under padi in this regard, availability of water supply and suitable flat lands are limiting factors.

However, the existing padi areas are increasingly being converted to double cropping, especially after the completion of the major irrigation schemes such as the Muda Project in Kedah–Perlis, and the Kemubu Project in Kelantan. By the end of 1975, about two-thirds of the wet padi lands had been so converted to double cropping.

It has been the policy of Government in recent years to increase padi production to the level of near self-sufficiency. Towards this end, the Government has taken a number of direct measures, including the annually guaranteed minimum price for padi, the free issue of high-yielding seeds, and the fertilizer subsidy scheme. Indirect support to padi planters through the expansion of drainage and irrigation facilities, rice research, better extension services and improved marketing facilities through the National Padi and Rice Board.

These measures have resulted in a steady increase in rice production – from 605,000 tons in 1963 to 1,163 million tons in 1974 – due both to larger areas being double-cropped and increasing yields per acre. Peninsular Malaysia now produces about 88% of its rice requirements, the balance being imported largely from China and Thailand.

Coconut

Botanical Name - Cocoa nucifera *Family – Palmaceae*

History

The origin and method of spread of coconut in Malaysia is not precisely known. Some sources believe that it might have come from South America by way of sea, but there are also indications to suggest that the palm had originated in the Malay Archipelago itself.

Coconuts are grown both on estates and smallholdings. The estate acreage is declining and is now about 51,000 ac. the area under smallholdings however has risen by nearly 10% during 1963 – 72. (Table 1). The larger estates had in fact played an important role in the development of the coconut industry having provided the 'lead' in coconut planting and in producing higher grade copra. Estates also introduced the technique of inter-cropping of cocoa with coconuts, a practice now being followed by smallholdings. Furthermore, estates are also providing high-yielding seedlings for the rehabilitation of smallholdings.

The declining interest in coconut cultivation is also due to the poor returns from the crop as compared to returns from other cash crops. Hence, estates are replacing coconut palms with oil palm wherever possible. This is not the case however in estates where inter-cropping with cocoa provides adequate returns from coconut plantings.

Smallholdings too have, to a very limited extent, replanted their old rubber and coconut with oil palm in areas where processing facilities are available in neighbouring estates. At present, smallholders operate almost 90% of the coconut area in Peninsular Malaysia and, with the decline of the crop in the estate sector, coconut cultivation in future may be undertaken largely by smallholdings.

Estates have an average yield of approximately 9 piculs of copra per acre; smallholdings yields are around 5 piculs per acre.

The discovery of the uniformly high yielding nature of the inter-origin hybrid Malayan dwarf x West African tall by the I.R.H.O. during the mid-50's in the Ivory Coast provided the ailing coconut industry here with a much needed boost. Characterised by its early yielding habit (in the 5th year) and high yields (35 piculs copra/acre) during maturity, this hybrid was introduced into Peninsular Malaysia in 1970, and its performance so far has been most encouraging. Popularly known locally as the MAWA hybrid coconut, it is now being mass produced for commercial exploitation in Malaysia. This hybrid is superseding the local Tall variety in importance.

Table 1. Coconut Area in Peninsular Malaysia, 1961–1974

Acreage / Year	Estates	Smallholdings	Total
1961	79,710	439,900	519,610
1962	77,760	431,800	509,560
1963	80,170	434,600	514,770
1964	71,720	436,500	508,220
1965	68,000	438,700	506,700
1966	63,080	442,700	505,780
1967	60,210	444,200	504,410
1968	56,560	460,200	516,760
1969	55,420	467,300	522,720
1970	55,430	472,300	527,730
1971	53,490	470,300	523,790
1972	51,180	470,900	522,080
1973	46,480	491,200	537,690
1974	n.a.	493,800	n.a.

(n.a. 0 not available)

The Government introduced in 1963 a Coconut Replanting and Rehabilitation Subsidy Scheme aimed at improving the economic position of the smallholders through the planting of inter-crops between rows of coconut palms. Under this scheme, about 90,000 ac. of smallholdings have been so rehabilitated.

Cocoa

Botanical Name – Theobroma cacao *Family – Sterculiaceae*

The name was given by the famous Botanist Linnaeus. 'Theobroma' in Greek means 'food of the gods'.

History

Cocoa most probably originated near the Andes in South America, and was introduced in Malaysia in 1778. Early records show that the crop could not be grown here successfully on a commercial scale for a variety of reasons.

During 1936 – 40, the Department of Agriculture ascertained through research, the suitability of cocoa as a plantation crop; several experimental plots were established in Serdang, Cheras, Kuala Lipis and Temerloh. However, it was only after the second World War that positive steps were taken to boost the cultivation of cocoa as a plantation crop. The Department of Agriculture intensified its research, which was concentrated mainly on breeding and selection.

The rich alluvial soils on the west coast of Peninsular Malaysia were found to be most suitable for cocoa. But, due to the limited area available, the better inland soils such as the Rengam and Jerangau series were also recommended for the cultivation of cocoa.

In 1950's, the cocoa industry in Malaysia suffered a serious setback in the form of dieback, and a combination of nutritional, environmental, soils, pests and disease problems. In consequence, the Department of Agriculture did not recommend cocoa as a plantation or smallholders' crop, although its research on the crop continued.

The 1960s saw some development in the cocoa industry in respect of research and management. A new variety of cocoa (Upper Amazon hybrids) was introduced, and this variety was found to be more vigorous and higher yielding than the existing Amelonado plantings, being able to recover from dieback more rapidly. In experimental cultivations an average yield of 1,000 – 1,500 lb of beans per acre was obtained. These findings improved the prospects of planting cocoa as a sole crop.

Official estimates indicate that, in 1974, some 46,200 ac. in Peninsular Malaysia were under cocoa (out of a total of about 7.2 million acres under cultivation).

Cocoa is grown on both estates and smallholdings, usually as an intercrop with coconut. In 1974, cocoa as a plantation crop accounted for about 56% of the total cocoa area (the rest were smallholdings).

The increase in the smallholding acreage was due to the compulsory inter-cropping effort under the Coconut Replanting and Rehabilitation Scheme. This resulted in the increase of cocoa acreage among smallholdings from about 3,200 acres in 1971 to 20,300 ac. in 1974 (mostly in Perak, Johore, Selangor, Penang and Province Wellesley).

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Planting of cocoa as a monocrop is comparatively a new development in Peninsular Malaysia, but is gaining momentum.

FELDA is giving special attention to this crop under its agricultural diversification programme. About 1,000 ac. in its 5,000 ac. pilot project have been planted up to 1975 with cocoa.

The estimated yield of dry cocoa beans in the smallholdings is 500 – 700 lb/acre per year. In the estate sector, yields of 1,500 lb/ac. are not unusual.

Tea

Botanical Name – Camellia sinensis *Family – Theaceae*

History

Tea is grown only on estates in Peninsular Malaysia. Pahang accounts for all the highland tea production (about 6,635 ac.), while Selangor and Perak produce the lowland tea (1,225 and 422 ac. respectively). The crop exhibits a wide range of temperature tolerances and can be cultivated in many different soil types. In Peninsular Malaysia, tea has had relatively few pest and disease problems. The most common pests are the tea mosquito bug, mites and leaf-rolling caterpillars, while the more common diseases are blister-blight and red root diseases. None of these pests and diseases are very serious or widespread, and measures are available to prevent and control them.

Cultivated tea falls into three groups, namely, China, Assam and Indo-China (Cambodia) 'jats'. In Peninsular Malaysia, the most widely grown group is the Assam 'jat'.

Yields vary with variety. Mature upland tea bushes may yield about 1,000 lb. of made tea per acre per year. In Peninsular Malaysia, the typical annual yield per acre is 1,500 – 1,800 lb. of made tea for highland and 2,000 – 2,500 lb. for lowland plantations. The output of made tea in Peninsular Malaysia was 6,500 tons in 1974.

Malaysian tea is of fairly high quality and is largely exported. Local requirements of tea are met by cheaper imported tea of lower quality from China, Indonesia and Sri Lanka. The balance of trade in tea products has recently shifted against Peninsular Malaysia to the tune of $2.9 million in 1974.

Coffee

Botanical Name – Coffea arabica *Family – Rubiaceae*

History

The coffee grown in Peninsular Malaysia is of the Liberia variety, and it seldom enters the international trade in coffee. Coffee is cultivated in smallholdings, the size of which are often less than 3 acres. There are very few farms with more than 10 acres. About 15,400 ac. are cultivated in Peninsular Malaysia, with Selangor having the largest acreage (1974 data included 11,279 ac. in Selangor, some 4,858 ac. in Johore and 1,312 ac. in Malacca).

The most serious pest of coffee is the bee-hawk moth (*Cephanodes hylas*) which has been responsible for the destruction of the coffee estates in Peninsular Malaysia in the

early years of this century. A very serious disease is coffee leaf rust (*Hemileia vaxtatrix*) which was also contributory to the massive reduction of the area under coffee in Peninsular Malaysia.

Yields vary enormously, ranging from 5 – 30 piculs of berries per acre per year under mixed cultivation and 40 – 50 piculs per year as sole crop. There is a definite seasonality in output, with the peak season occurring between November and January. Based on an average yield of 30 piculs of berries per acre, per year, the production of coffee in Peninsular Malaysia amounted to 33,200 tons in 1974.

Domestic production being unable to meet local demand, inputs of coffee amounted to $7.7 million in 1974.

FAMA has recently established for coffee smallholders a marketing and trading scheme, which also covers the processing of coffee beans into coffee powder.

Soya Bean

Botanical Name – Glycine soja *Family – Legumonose*

Unlike other major crops in this country which are of foreign origin, the soya bean is a native of South East Asia.

Soya bean was once cultivated experimentally in Johore only, but has now become a "Green Book" crop. Pilot 'plantations' have already been established, especially in Trengganu.

There are already over 1,000 ac. under cultivation of soya bean which is considered by the Research Institute of Malaysia as a good inter-crop.

Since it is a leguminous plant, soya bean fixes nitrogen to the soil, thereby helping to shorten the immaturity period in rubber and also keeps out the weeds.

Soya bean is subject to attacks by insect pests, especially the bean fly and caterpillars. The most serious leaf diseases affecting the crop are bacterial pustule and rust. The pests and diseases are however controllable.

The estimated yield range of soya bean in Peninsular Malaysia is 1,300 – 1,600 lb/ac. Production of soya bean was 546 tons in 1974, and Peninsular Malaysia was a net importer of soya bean and its products to the value of $28.6 million in 1974. The main suppliers were China, Taiwan, Singapore and Brazil.

The Pahang State Agricultural Development Corporation has planned to undertake soya bean cultivation on a large scale in joint-venture with the private sector. The proposed 10,000 ac. soya bean estate may be located in the Pekan District, if the current feasibility studies prove the crop's viability.

Pineapple

Botanical Name – Ananas comosa *Family – Bromeliaceae*

The original home of pineapple is believed to be Paraguay where people called it the

'Anana' (meaning the 'excellent fruit'). The English named the fruit as 'pineapple' because they thought it was a kind of apple, which also looked like the fruit of the pine.

Pineapple was introduced around 1888, when it was grown as a cash crop among the rubber trees in Johore. The crop was then grown on a large scale in Singapore, where a French sailor opened a factory for its canning. Many areas in Peninsular Malaysia came into planting in between the two world wars, Johore being the chief producer.

Three varieties of pineapple are grown in Peninsular Malaysia: The Sarawak, the Mauritius and the Singapore-Spanish. The first two are intended for table consumption in fresh state, while the third is largely for canning.

In effect, there are two distinct lives of pineapple growing in the country; cultivation of the Singapore-Spanish variety is concentrated in Johore where the pineapple canning and processing industry is located, while the non-canning pineapple varieties are grown in all States of Peninsular Malaysia (except Trengganu and Perlis) with Johore and Perak as the major producers. The crop is produced both by smallholders and estates, although the estate area under pineapples is declining rapidly.

The planted area in 1974 totalled 45,000 ac. for the canning variety and over 8,000 ac. for the non-canning varieties.

Malaysian pineapple is unique in the world in that it is the only variety grown on peat soil, and ratooning is allowed to proceed indefinitely once the crop has been planted.

The average yield is 7.8 tons of pineapples per acre per year for all varieties. On this basis, the total domestic output of pineapples amounted to 421,000 tons in 1974.

Recently, the industry showed signs of decline, and the Malaysian Pineapple Industries Board (MPIB) encouraged the pineapple smallholders to replant their crop with higher-yielding, improved clones. A replanting subsidy is also paid (in cash and kind) to pineapple smallholders.

Malaysia exports fresh pineapples, canned pineapples and pineapple juice. The net trade balance in pineapples was in Malaysia's favour to the value of $52.8 million for 1974.

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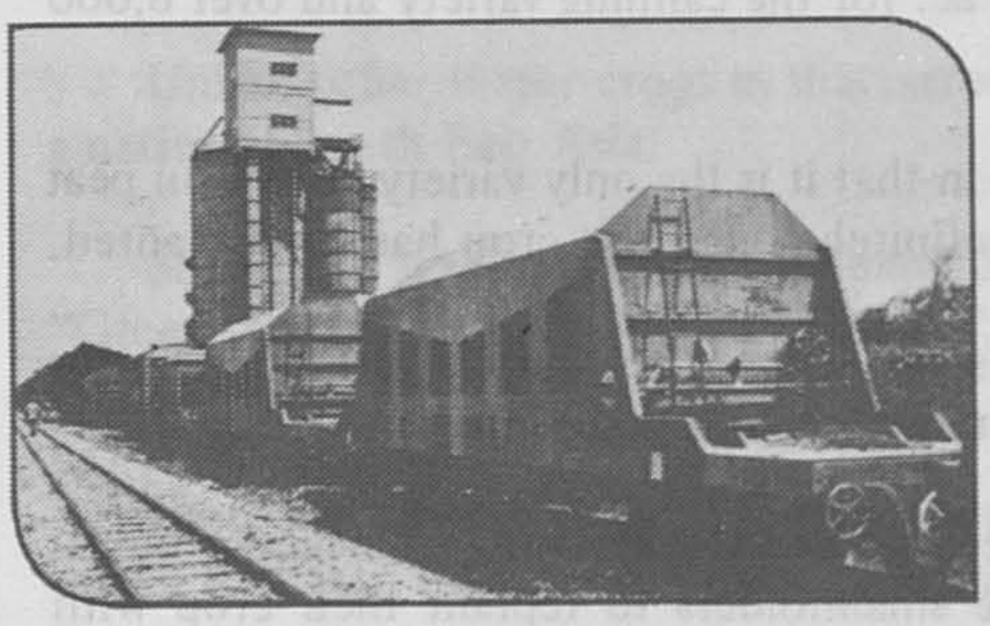

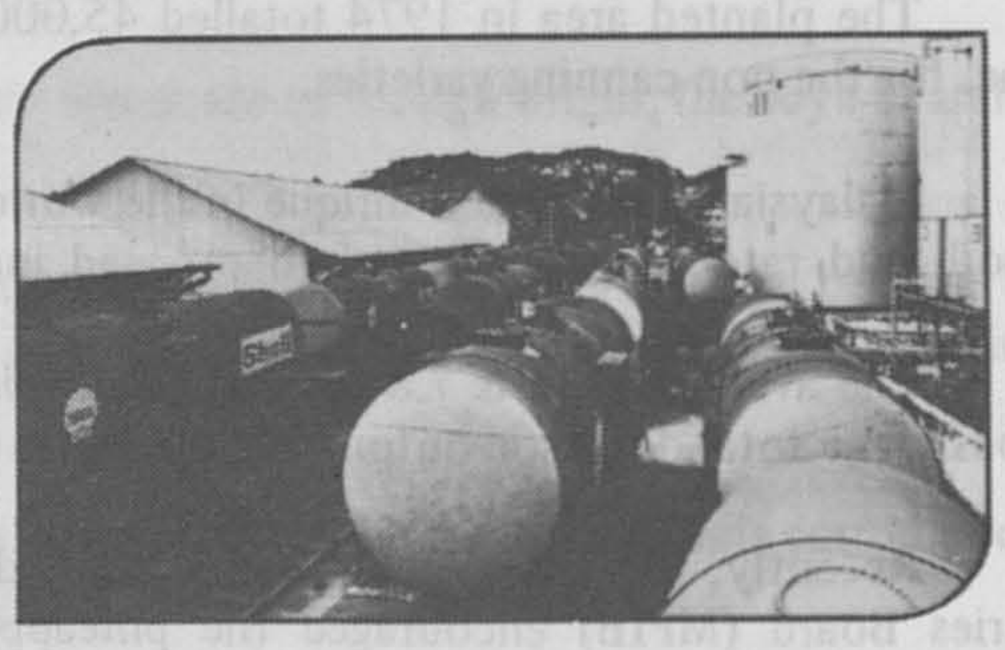

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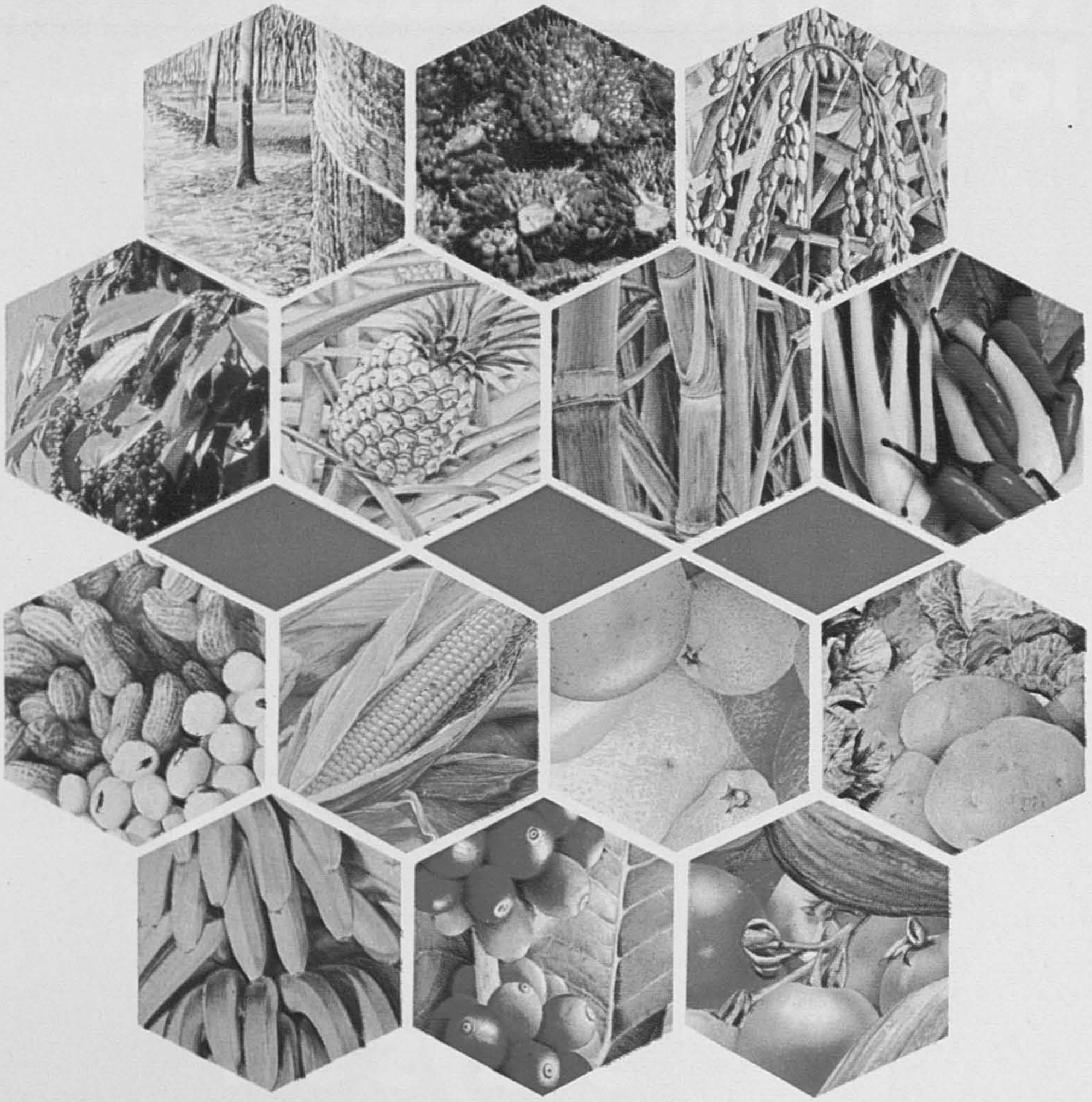

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The Factories and Machinery Act 1967 as applied to estate machinery +

HARMINDER SINGH*

Under the definition of this Act, factories vary in size irrespective of whether machinery is used or not, ranging from large new integrated plants or complexes and dredges to the small cottage factory where no machinery is used and employing only five workers or more. The Factories Machinery Act 1967 is the enforcement tool for the occupational safety and health of workers which at this moment is confined to factories and places where machinery is used. Thus the Factories and Machinery Act 1967 covers all estate machinery except for mobile agricultural machinery and manual operated machinery which are exempted under this act.

The Regulations made under the act which are applicable to estate machinery are as follows:

(a) The Factories and Machinery (Steam Boilers and Unfired Pressure Vessels) Regulations 1970.

(b) The Factories and Machinery (Fencing of Machinery and Safety) Regulations 1970.

(c) The Factories and Machinery (Notification, Certificate of Fitness and Inspection) Regulations 1970.

(d) The Factories and Machinery (Safety, Health and Welfare) Regulations 1970.

(e) The Factories and Machinery (Persons-in-Charge) Regulations 1970.

(f) The Factories and Machinery (Certificate of Competency Examination) Regulations 1970.

I intend to discuss only the salient points of these regulations as applicable to estate machinery.

1. STEAM BOILERS AND UNFIRED PRESSURE VESSELS

Every palm oil mill has boilers and unfired pressure vessels for the generation of power and for processing, i.e. sterilization, pressing, purification or clarification, and storage. Some rubber factories use boilers for drying rubber.

(a) *Imported boilers and unfired pressure vessels*

Any boiler or pressure vessel imported into Peninsular Malaysia must satisfy the Director General that it is designed to standard engineering codes of practice and the

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*Jabatan Kilang dan Jentera, Kementerian Buruh dan Tenaga Rakyat, Kuala Lumpur.

+Paper presented at the ISP Conference on Estate Engineering & Mechanization 1975.

design of each of these vessels is checked and a maximum safe working pressure is assigned to such a vessel which the Director General deems fit and which may not necessarily be the same as that given by the manufacturer. For this approval the owner or importer shall submit to the Director-General three drawings showing the principal dimensions of the vessel with a longitudinal section and an end view, details of materials, scantlings, rivetting, welded joints and all data expressed in the English language necessary to assign an authorized safe working pressure. Particulars of the code regulations or specifications to which the steam boiler or unfired pressure vessel is designed and details of the formulae and calculations of design pressure are also to be submitted. In addition the owner or importer has to submit a certificate in the English language from the maker of the steam boiler or unfired pressure vessel describing the same, and giving the particulars of the materials used in its construction, the design pressure, the maker's serial number and the hydrostatic test to which the vessel has been subjected. Lists of approved material codes, design codes, regulations or specifications, inspecting authorities, and the fittings required are set out in the regulations.

(b) *Locally fabricated pressure vessel*

In the case of locally manufactured steam boilers or unfired pressure vessels only firms and contractors that have satisfied the Director General that they have suitable equipment and welders who have passed the welding tests conducted by this department, are permitted to manufacture steam boilers and unfired pressure vessels. There are about 30 firms in Peninsular Malaysia permitted to manufacture unfired pressure vessels of which one firm is approved for the manufacture of gas cylinders and another two for the manufacture of fire extinguishers. The manufacture of locally fabricated steam boilers has also started with a single firm enjoying the monopoly. Most of the unfired pressure vessels locally manufactured are vessels for use in the oil palm industry, air receivers and water filters for treatment of feed water to boilers and drinking water on estates.

2. PERMITS TO OPERATE MACHINERY PENDING INSPECTION

Under the Act an owner has to obtain the approval of an Inspector prior to the installation of any machinery. In order to obtain this approval he has to submit all the particulars as required in the prescribed forms together with the layout drawing of his factory showing the distances between the machines and any other safety features, built in the machine. Only on receiving written approval may the owner start installing his machinery according to the approved plan. He then has to serve a written notice on the Inspector before the machinery is used stating that his installation is now completed and that he intends to use the machines. The owner may operate the machinery (except pressure vessels and lifts) after one month of such notice. However if the owner intends to operate the machinery at an earlier date he has to obtain the written permission of the Inspector.

3. INSPECTIONS

The Factories and Machinery (Notification, Certificate of Fitness and Inspection) Regulations 1970 require that all machinery and factories be inspected initially and thereafter at 15 months intervals. This period may be varied by 3 months depending on an Inspector's discretion. Any variation in excess of 3 months can only be made by the Director General on recommendations of the area Inspector who may extend this period between inspections to 3 years. If an owner requires an inspection before the 15 months period say

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because of low crops and the opportunity to shut down his plant for proper maintenance, he may request the Inspector for this unscheduled inspection.

Other than the initial and regular inspection an Inspector is empowered to enter any factory and to make surprise visits carried out to ensure that the required standards of safety and health are maintained in the factory at all times. When additional machinery has been installed or existing machinery altered an Inspector pays an extra visit to ensure that safety requirements are complied with. In the case of boilers and unfired pressure vessels supplementary visits are made to check if the safety valves are set to blow off at the correct safe working pressure and that there is no accumulation of pressure in the vessels when the boiler is on high fire and with the safety valves blowing. Certificates of Fitness are only issued for boilers, unfired pressure vessels and hoisting machinery. There are no certificates of fitness for factory machinery but instead a Factory Report is given to the owner at the time of the Inspection.

Where an Inspector finds that any machinery or factory does not comply with the requirements of the Act or any Regulations, he is required to serve an order to the owner to make good or remove the defects within such period as he may specify. But where the defect is in the opinion of the Inspector likely to cause immediate danger to life or property he is required to order the owner to cease operations immediately. An Inspector is also empowered to render inoperative any machinery which does not comply with the Act or Regulation by affixing a seal or by other means. Normally sealing of machinery is only employed as a last resort after friendly persuasion and attempts at safety education have failed, and after persistent refusal on the part of the employer to fit guards for the protection of his workers.

4. PANEL OF EXAMINERS

The Factories and Machinery (Persons-in-Charge) Regulations 1970 require certificated persons to be in charge of certain machinery on estates and palm oil mills. The Panel of Examiners hold examinations for certificates of competency as Engineers, and Engine Drivers in the following grades:

Engineer Steam First and Second Grade.
Engineer Internal Combustion Engine First and Second Grade.
Engine Drivers Steam First and Second Grade.
Engine Drivers (I.C.E.) First and Second Grade.

The qualifications and experience required before a candidate is eligible to sit the above examinations are listed in the Factories and Machinery (Certificate of Competency Examination) Regulations 1970. These regulations also provide for the endorsement of Certificates to permit the holder of a steam certificate to obtain an I.C.E. qualification and *vice versa.*

5. APPEAL

Any owner or person who is aggrieved by an order made by an Inspector under this Act or Regulation may, within 21 days from the date of such order, appeal to a Senior Inspector who may after considering the case by the person, order in writing confirm, annul or vary the order. Further if the person is aggrieved by the order made by the Senior Inspector he may within 21 days appeal to the Director General, who shall refer it to a Board of Appeal who after hearing such evidence may confirm, annul or vary the order of the Senior Inspector.

Thus the Board of Appeal consists of persons of engineering and other appropriate skills appointed by the Minister of Labour.

6. MACHINERY GUARDING

The Factories and Machinery Act 1967, stipulates that every dangerous part of machinery is to be securely fenced unless it is safe by position. The term "safe by position" means that a dangerous part be out of reach either because of distance or because some essential part of the machine excludes the possibility of contact with the dangerous part. Under the Act 6ft. 6in. from the working surface is a safe limit of reach upwards. Thus a dangerous part that is beyond an upward reach of 6ft. 6in. is regarded as notionally safe by position and thus a dangerous part that is within 6ft. 6in. should be fenced. Let us now look into the guarding of (a) sheet rubber machinery and (b) crepe rubber machinery, as these are an integral part of any rubber factory in Malaysia.

(a) *Sheet rubber machinery*

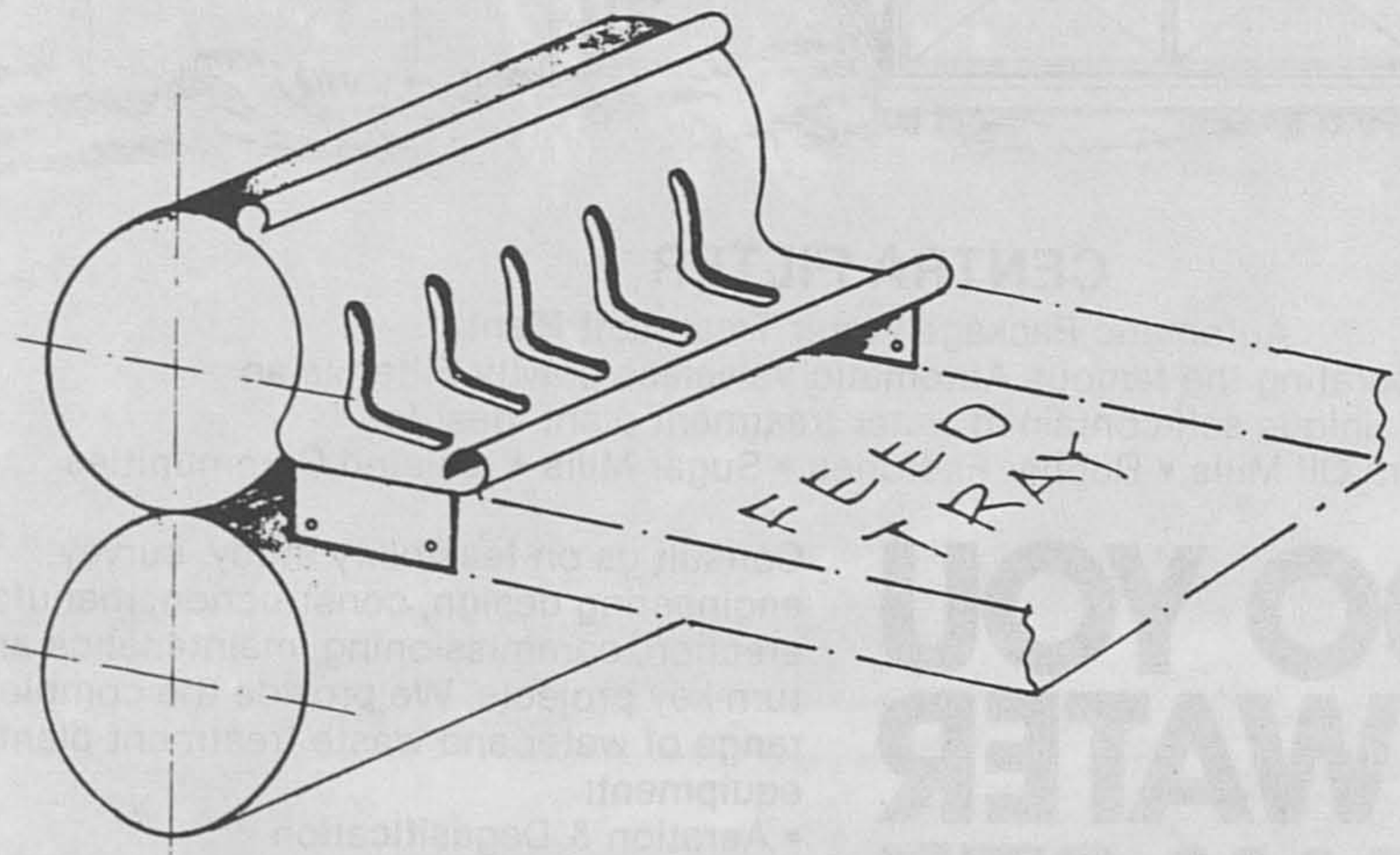
In early days when the rubber sheet machines and rubber creping machines were unguarded the loss of an arm or hand was common when an accident occurred with these machines.

The early guards consisted of fixed distance safety bars which were inadequate. These guards had to be developed to provide a greater degree of protection while not reducing the rate of production. Furthermore the earlier sheeting machines, which were hand driven, were converted to power drive. Thus the tunnel guard was developed for the sheeting machine. This tunnel guard is normally made of aluminium because it is sufficiently strong and is non-corrosive. In the open-headed sheeting machine the tunnel guards are fitted to all sets of rolls. At the first head the vertical opening is a maximum of 1¾in. at a distance of not less than 9in. from the nip of the rolls. At all other heads the vertical opening is not greater than 1in. at a distance of not less than 6in. from the nip of the rolls. In a close headed sheeter all the sets of rolls are mounted on a single frame and it was found that where the rolls are less than 18in. apart it is impractical to use tunnel guards on all the heads. Thus for this machine a tunnel guard is provided only at the first head and an interlocked fencing protects the subsequent rolls from contact. The interlocked fencing prevents the machine from being started while the guard is not in position and disconnects the source of power before the guard is lifted. With the development of this tunnel and interlocked guard the accidents on sheeting batteries were fewer and where accidents have occurred it was found that the dimensional specifications had not been adhered to or the guard had been damaged. *Fig. 1* shows a tunnel guard.

(b) *Crepe rubber milling machine*

The horizontal milling machine consists essentially of two rolls about 12in. each in diameter mounted obliquely on a sturdy frame on a plane which makes an angle of about 30^{o} to the horizontal. It is not possible to provide tunnel guards on these rolls as the raw material is not clean nor is it the same shape as the finished product. Also in the creping process the raw material is subjected to breaking, joining and turning so as to achieve a homogeneous blending of the raw material. For this machine therefore, the platform guard was developed. This guard provides protection along the whole length of the rolls. The dimensions specified are the vertical height from the working level to the edge of the platform guard which is to be not less than 39 inches. The distance from the nip of roll to the edge of platform guard is to be not less than 30 inches. This 30in. distance is just beyond the reach of an average

Malaysian worker to the nip of the rolls while working in a normal comfortable position. Thus any distance less than 30in. would place the nip of the rolls within the reach of an average Malaysian worker and would be a danger to him or her. Furthermore, a distance greater than 30in. although safe, would be uncomfortable to the worker and might hinder production. Thus this dimension may be varied by an Inspector to suit exceptional circumstances *(Fig. 2)*. This platform guard has been found adequately to guard the worker and at the same time allow the worker to work in comfort. Also it does not hinder production. As an additional protection a trip wire is situated on a vertical centre line of the front roll and at 4ft. from the working level, as shown in the figure. The purpose of this trip wire is to act as an emergency stop device which should stop the rolls within 3 seconds from the time it is tripped. This time of 3 seconds for the stoppage of the rolls is measured when there is no rubber between the rolls.



TUNNEL GUARDS for SHEETING BATTERIES

To be fitted to all heads except 1st head. The figures in brackets are for the 1st. head. To be attached to feed tray by rivets Edges to be flanged 1" dia as shown. Material :- Aluminium Thickness to be not less than $\frac{1}{16}$". Underside of feed tray to be reinforced if necessary to prevent "springing". Observation slots. $\frac{3}{8}$" wide, can be cut if desired.

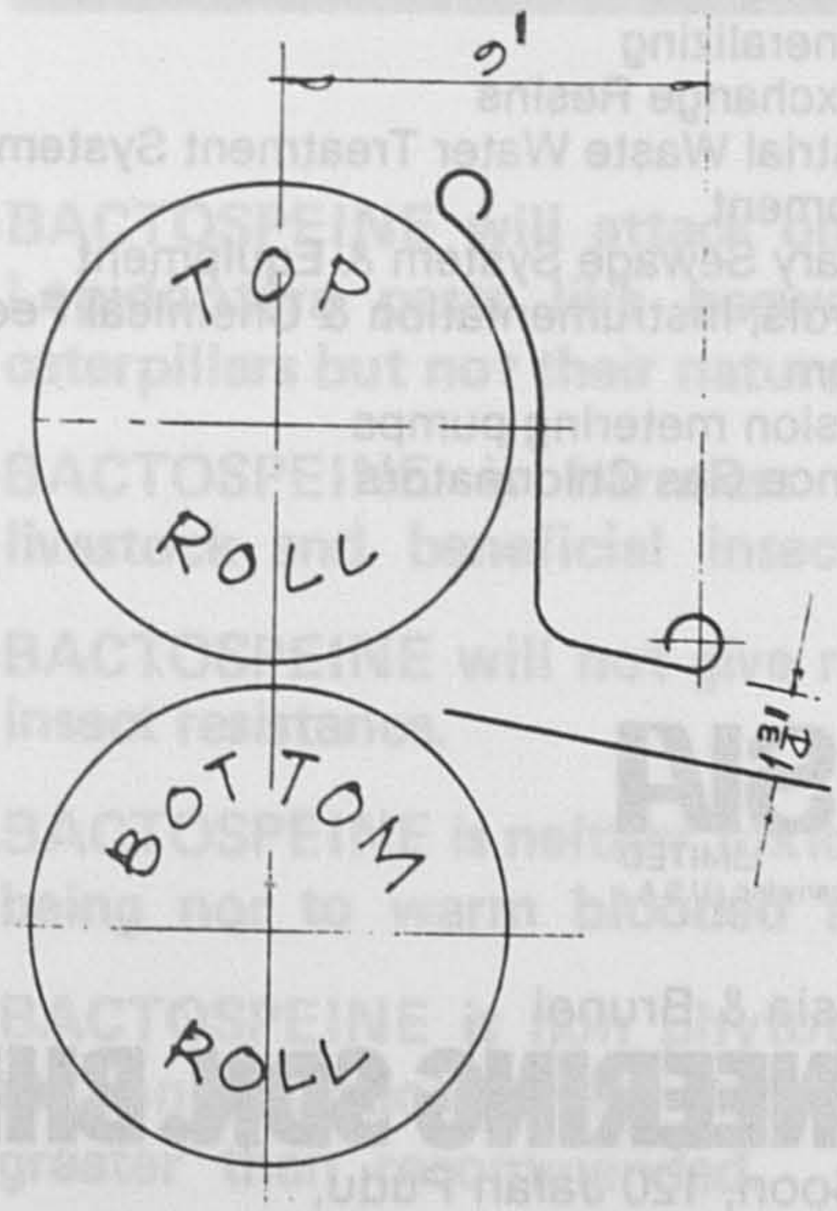


Figure 1

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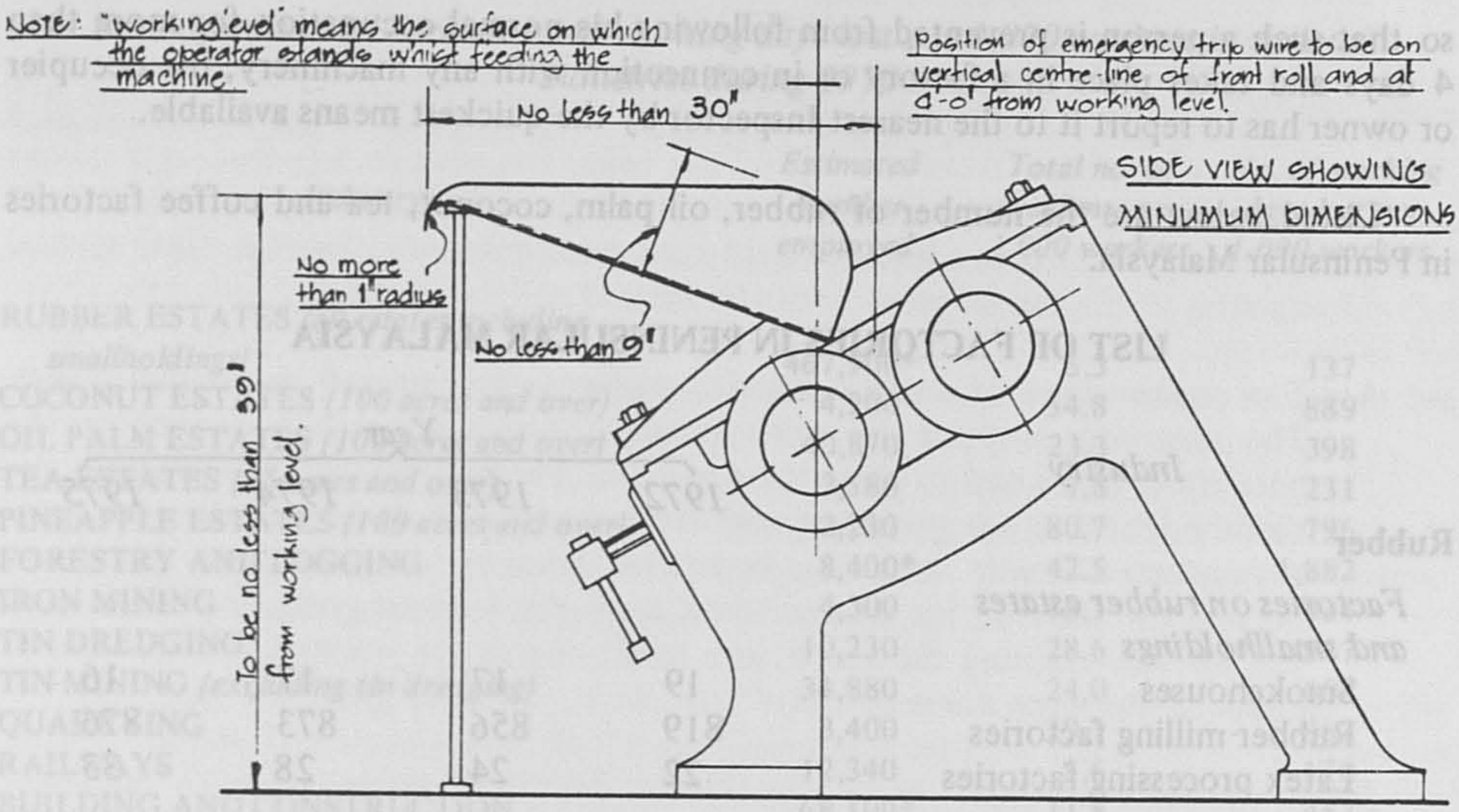


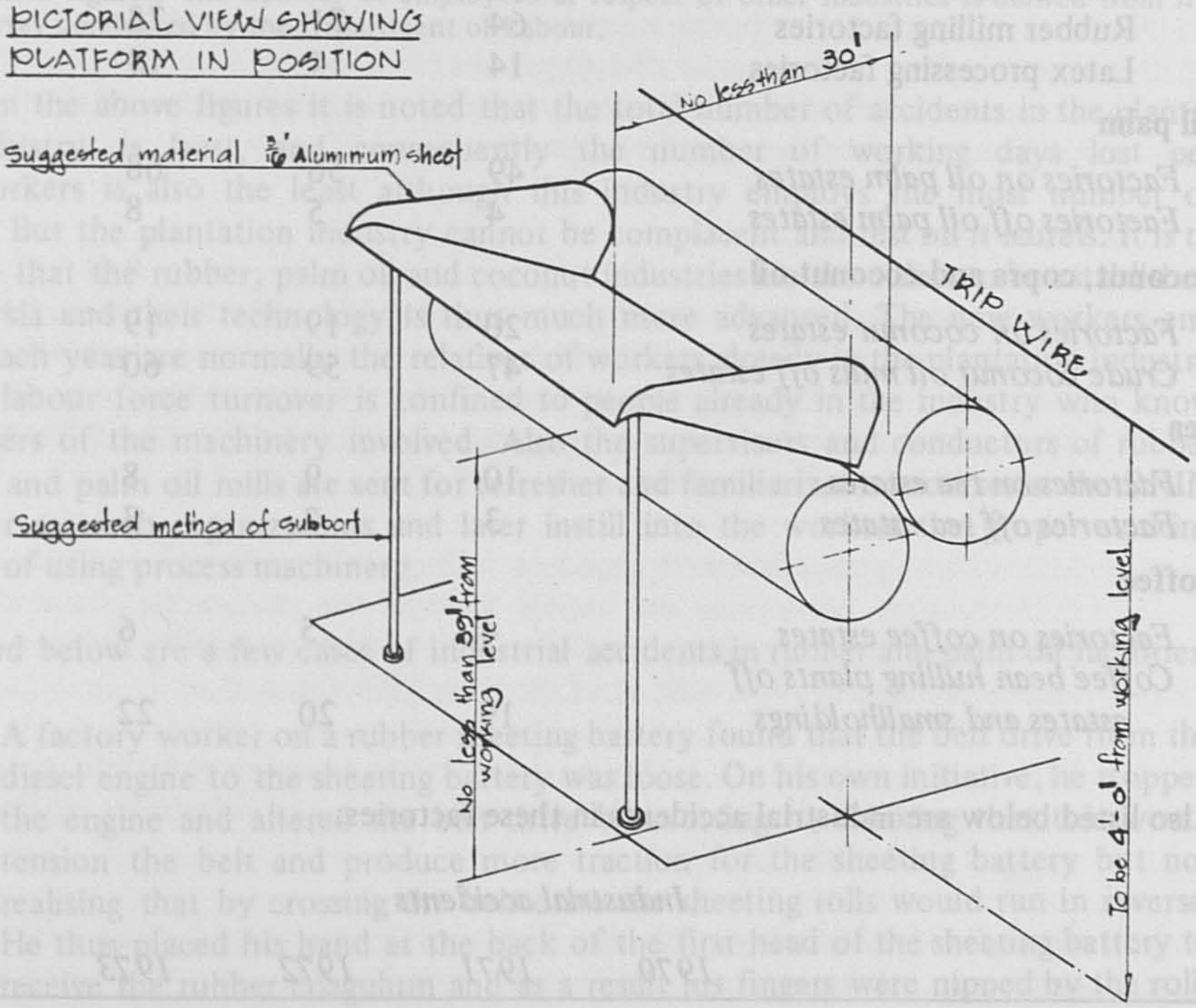


Figure 2

7. ACCIDENTS

An accident may be defined as an unexpected occurrence which hinders or stops the continuation or flow of some process. Accidents may involve injuries to persons and or damage to plant or both. Under the Factories and Machinery Act 1967 any accident which either (i) causes loss of life to any person or (ii) causes bodily injury to any person

so that such a person is prevented from following his normal occupation for more than 4 days and takes place in a factory or in connection with any machinery, the occupier or owner has to report it to the nearest Inspector by the quickest means available.

Listed below are the number of rubber, oil palm, coconut, tea and coffee factories in Peninsular Malaysia.

LIST OF FACTORIES IN PENINSULAR MALAYSIA

Industry	*Year*			
	1972	*1973*	*1974*	*1975*
Rubber				
Factories on rubber estates and smallholdings				
Smokehouses	19	17	17	16
Rubber milling factories	819	856	873	876
Latex processing factories	22	24	28	33
Factories off estates and smallholdings				
Smokehouses	16	16	18	20
Rubber milling factories	64	71	78	78
Latex processing factories	14	14	18	20
Oil palm				
Factories on oil palm estates	49	56	68	69
Factories off oil palm estates	4	5	8	9
Coconut, copra and coconut oil				
Factories on coconut estates	20	19	19	19
Crude coconut oil mills off estates	47	59	60	60
Tea				
Factories on tea estates	10	9	8	8
Factories off tea estates	3	3	3	3
Coffee				
Factories on coffee estates	4	5	6	6
Coffee bean hulling plants off estates and smallholdings	19	20	22	22

Also listed below are industrial accidents in these factories:

Industrial accidents

	1970	*1971*	*1972*	*1973*	*1974*
Rubber industry	85	109	136	66 (1)	66
Oil palm	57 (2)	41	36 (2)	91 (1)	79 (1)
Coconut, copra and coconut oil	2	2	3 (1)	3 (1)	1
Tea	2	4	5	–	1

N.B. Figure in brackets indicates the number of fatal accidents. Now let us compare the rate of industrial accidents in various industries for a particular year 1970.

Rate of industrial accidents and working days lost per 1,000 workers in various industries during 1970

Industry	*Estimated number employed*	*Total no. of accidents per 1,000 workers*	*No. of working days lost per 1,000 workers*
RUBBER ESTATES *(all estates including smallholdings)*	467,900*	6.3	137
COCONUT ESTATES *(100 acres and over)*	4,200	54.8	889
OIL PALM ESTATES *(100 acres and over)*	40,870	23.3	398
TEA ESTATES *(25 acres and over)*	3,580	7.8	231
PINEAPPLE ESTATES *(100 acres and over)*	2,230	80.7	796
FORESTRY AND LOGGING	8,400*	42.5	1,882
IRON MINING	4,300	18.1	434
TIN DREDGING	10,230	28.6	547
TIN MINING *(excluding tin dredging)*	34,880	24.0	602
QUARRYING	3,400	29.1	863
RAILWAYS	12,340	5.6	170
BUILDING AND CONSTRUCTION	68,100*	11.8	457

*1967 census figures. The number of employees in respect of other industries is derived from the annual survey conducted by the Department of Labour.

From the above figures it is noted that the total number of accidents in the plantation industry is least, and consequently the number of working days lost per 1000 workers is also the least although this industry employs the most number of workers. But the plantation industry cannot be complacent and rest on it laurels. It is to be noted that the rubber, palm oil and coconut industries are the oldest to be established in Malaysia and their technology is thus much more advanced. The new workers employed each year are normally the relatives of workers already in the plantation industry and the labour force turnover is confined to people already in the industry who know the dangers of the machinery involved. Also the supervisors and conductors of rubber factories and palm oil mills are sent for refresher and familiarization courses at the RRIM and other research organizations and later instill into the workers the proper working methods of using process machinery.

Listed below are a few cases of industrial accidents in rubber and palm oil factories:

1. A factory worker on a rubber sheeting battery found that the belt drive from the diesel engine to the sheeting battery was loose. On his own initiative, he stopped the engine and altered the belt drive by crossing it, thinking that this would tension the belt and produce more traction for the sheeting battery but not realising that by crossing the belt drive the sheeting rolls would run in reverse. He thus placed his hand at the back of the first head of the sheeting battery to receive the rubber coagulum and as a result his fingers were nipped by the rolls which were running in reverse direction.

2. The operator of a rubber creping machine went to the toilet and left his machine running unattended. A new worker who had no training in the use of rubber creping machines and who was not supposed to work on this machine saw the machine running unattended and started to feed crepe rubber into the rolls. Consequently his right hand was caught in the nip of the rolls and his hand was amputated.

3. A female worker had her left index, middle and ring fingers amputated as a result of an accident while operating a two roll power driven laminator. The tunnel guard of the laminator was set at 1 1/8in. clear vertical opening at a distance of 6¾in. from the nip of the rolls. The woman was feeding a rubber pad of ¾in. thickness into the rolls when her left hand fingers were nipped between them. This accident could have been prevented had the clear vertical opening of the tunnel guard been 1in. instead of 1 1/8 inches.

4. The paddle screw of a steam-jacketed conveyor got jammed in a palm oil mill. The supervisor stopped the conveyor and instructed the fitter to remove the wire mesh guard and to clean the conveyor. The mill manager returning to the factory found it not operating and ffb accumulated at the unloading ram. He remonstrated loudly with the supervisor who in his excitement and fright pressed the start button of the screw conveyor without giving any warning to the workers cleaning the screw; as a result one of the workers was churned to death by the screw conveyor.

From the case histories of the accidents described above it is to be noted that accident prevention is one of the main functions of this department.

Accident prevention is both science and art and represents control of man performance, machine performance and physical environment. Accident prevention is a vital factor in every industrial enterprise, one which if ignored or practised unskillfully, leads to needless human suffering and business bankruptcy.

The four basic remedies are:

(a) Engineering revision – including the guarding of machine and tools, isolation of hazards, revision of proceedings and processes, illumination, ventilation, colour and colour contrast, provision of personal protective devices, substitution of safer tools etc. replacement and repair and a wide variety of similar steps of a mechanical or physical nature.

(b) Instruction, persuasion and appeal including training as well as instruction and re-instruction, persuasion and appeal through the motivating characteristics of persons (factory psychology) visual as well as oral approaches, safety education, and safety organization with all of its many activities.

(c) Personnel adjustment – including selection and placement with regard to the requirements of the job and the physical and mental suitability of the worker, medical treatment and advice.

(d) Discipline – including mild admonishment, expression of disappointment, fair insistence, statement of past record, transfer to other work and penalties.

It is hoped that these four basic remedies of accident prevention will be practised by the plantation industry as an example for other industrial enterprises to follow.

BIBLIOGRAPHY

ANNUAL REPORTS OF THE MINISTRY OF LABOUR AND MANPOWER FOR 1970, 1971, 1972 AND 1973.

DISCUSSION

The following is a paraphrased report of the salient points which emerged during the discussion which followed presentation of the papers by R D Parry and Harminder Singh.

Mr C D H Hartley requested confirmation of the status of estate workshops which were wholly utilized for the maintenance of estate vehicles and machinery. Mr Harminder Singh said that an estate workshop is an installation not a factory; in other words the work performed in the estate workshop was not for gain. Mr Hartley asked whether the estate workshop was therefore subject to the 15 month inspections, to which Mr Harminder replied that it was, but that no certificate is issued.

Mr Harminder Singh was asked about rules governing the installation of replacement plant and said that with replacements and alterations it was still necessary to submit layout plans, and that an instant reply usually followed.

Mr Chan Wai Pong asked Mr Harminder Singh to clarify the accident figures in the latter's paper. The author said that these figures referred to accidents *in* factories *on* estates.

Mr I T Stevenson asked what was the approximate power loss in an air-cooled engine caused by the cooling fan. Mr Parry said that in small engines, say up to 10-15 hp there was virtually no loss of power. Fans were usually of plastic and thus only a fraction of the weight of the flywheel. In bigger engines the power loss might be in the order of ½ - ¾% but here again the fans would be of light-weight material and a fraction of the flywheel weight.

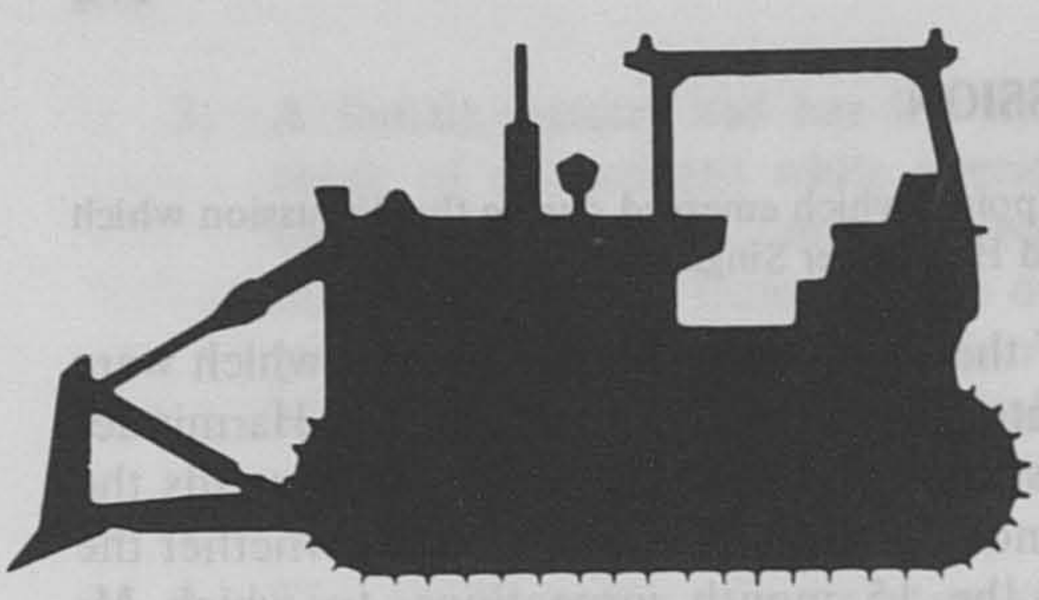
In reply to a question on the damping of the noise-level of air cooled engines by using water-cooling, Mr Parry said that this required a source of water and a radiator or header tank; a radiator required a fan and it was very difficult to dampen fan noise.

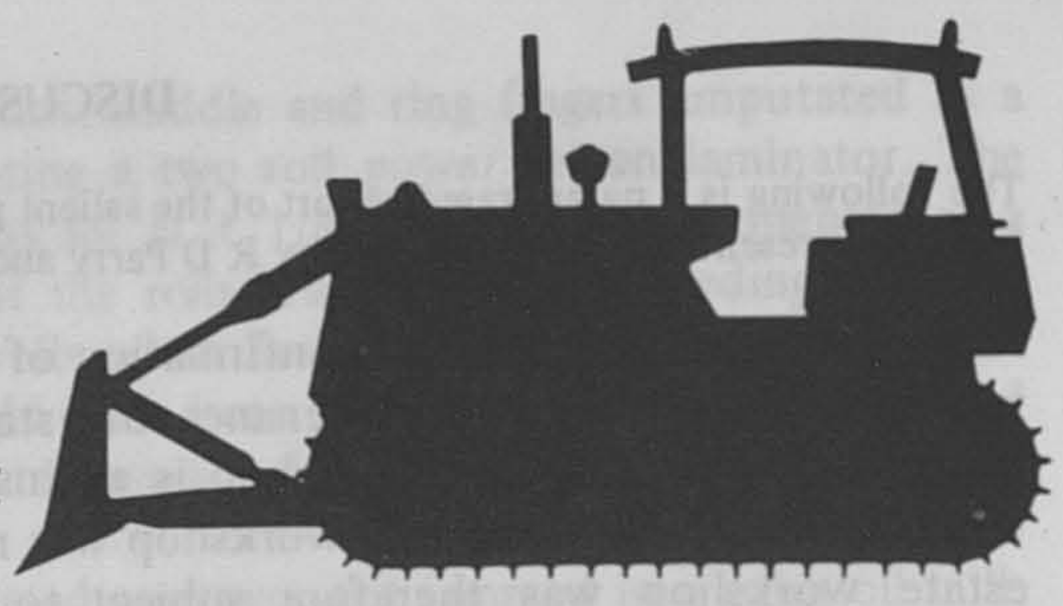
Mr Hartley said that his estate cooled engines with tanks, not radiators. This helped reduce (fan) noise, and the engine shed could be further sound-insulated with cladding or softboard. Mr Parry said that he had really been referring to mobile engines and pumps such as used on construction sites. The problem was much simpler with static plants.

Mr Harminder Singh reminded delegates that the internal height of engine and pump houses rooms must be at least 10ft and that there should be a minimum of 2ft 6in. space all round the engine. Plenty of ventilation was essential.

Mr Sangat Singh asked if phases in supply could be balanced automatically. Mr Parry said that there was very little that could be done about this. The only thing to be tried would be to minimize the period of phase imbalance which gives rise to over-heating of the alternator. Nevertheless alternators could tolerate very considerable heat rise in their windings and insulation provided they were designed for tropical use. By and large however, phase imbalance was not a serious problem.

Mr Parry said that for a manager's bungalow, up to a 6Kva, single-phase, unity power machine would suffice. Anything above this, say 6-9½Kva, would accommodate an air-conditioner, deep freeze, tv, stereo etc. For these smaller units a certified fitter is not required. For larger units one should go for 3-phase, 0.8 power-factor, 415 volts.





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Also add: ..... **repairs and downtime costs**

Then subtract: ..... **resale value**

And That's: ..... **TOTAL COST**

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	Model A	Model B	Model C
1. Initial price	184,500	226,000	190,000
2. Operating costs over 12,000 service meter hours	138,120	138,120	138,120
3. Repair costs over 12,000 service meter hours	309,960	230,520	273,600
4. Downtime costs over 12,000 service meter hours	77,490	46,100	82,080
Total owning and operating costs (1, 2, 3 & 4)	710,070	640,740	683,800
Less Residual Value after 12,000 service meter hours	36,900	67,800	28,500
Total Cost	**673,170**	**572,940**	**655,300**

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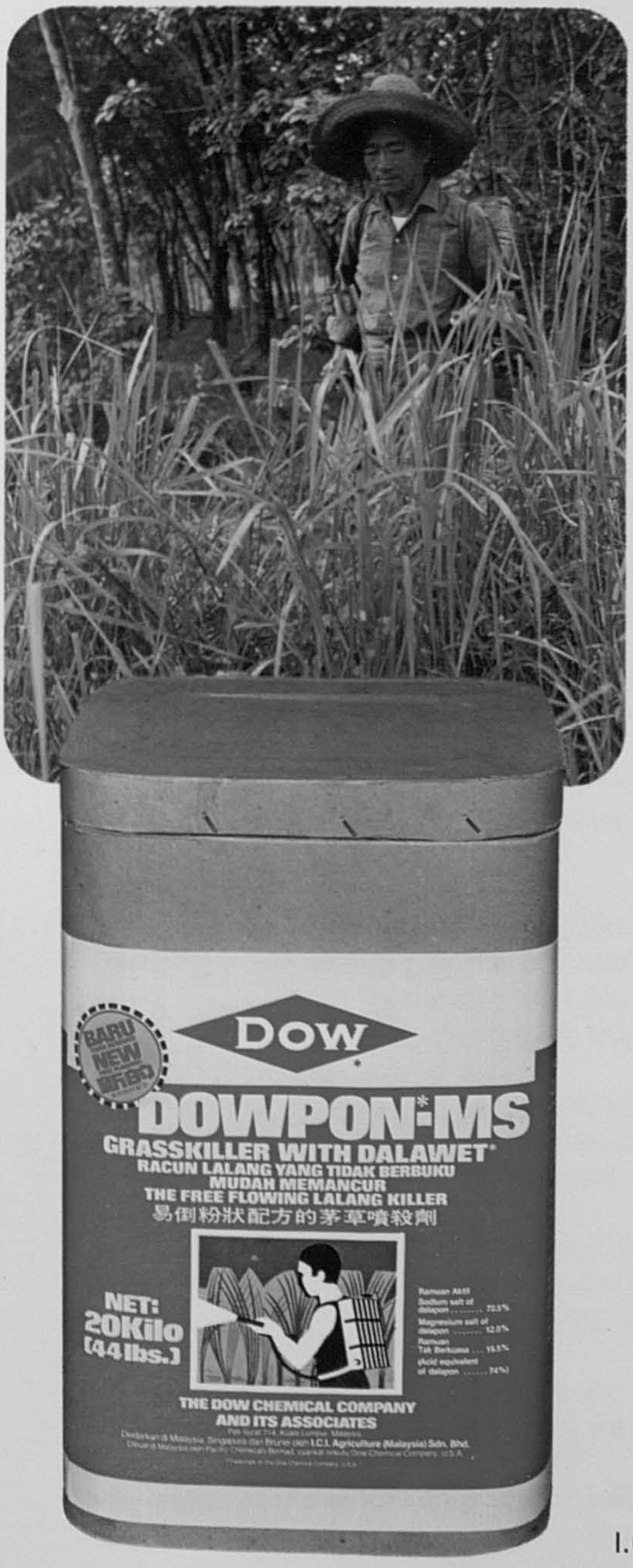

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A paper presented by RRIM at the 1976 Planters' Conference states:

"In large-scale spraying of herbicides for effective control of sheet lalang on flat land where water supply was available, the average labour requirement for spraying was 3.25 man-days per hectare for dalapon and 3.08 mandays per hectare for glyphosate. To work out the cost per hectare of lalang control, only treatments which gave 90% and more effective control for an average duration of eight weeks or more were considered. On clayey loam soil, the average cost for effective control of 1 ha of lalang was about $220 with dalapon. With glyphosate the cost was $543 per hectare. There was a saving of $323 per hectare with dalapon. On sandy soil or in shaded areas the average cost of using glyphosate was $319 per hectare compared to $185 with dalapon."

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Technical Education Scheme
Estate book - keeping examination

24th November 1976

(Examiner's comments on answers)

9.00 a.m. *Time: 2 hours*

The maximum marks for each question are shown in brackets

Candidates are required:

(a) To answer all questions.
(b) To start each question on a fresh sheet.
(c) To arrange answers in the numerical order of the questions.

Question 1 (20 marks)

On the 5th November the Chief Clerk brings in the estate cash book for your inspection. You are concerned to note that it shows the estate to have an overdraft of $2,899.24 at the bank as at 31st October since the bank have not granted an overdraft facility to the estate. However, the bank statement shows that the bank had the sum of $3,624.11 standing to the credit of the estate as at 31st October. You decide to reconcile the two figures and your investigations reveal the following:-

OCT.	5th	Cheque drawn in payment of Quit Rent remained unpresented	$20,000.00
	20th	Proceeds from the sale of rubber logs received by estate and entered in the cash book but not paid into the bank.	3,600.00
	21st	Cheque to Leasing Company not presented for payment by them	3,793.00
	22nd	An overseas buyer, Messrs Threadhare tyres had sent a cheque direct to the estate which had been entered in the cash book but the Chief Clerk had failed to lodge it with the bank	14,710.10
	29th	A cheque to the insurance company had been written out and entered in the cash book but had not been sent out in the post	1,540.45
	31st	A member of the staff repaid a loan and although entered in the cash book it was not paid into the bank until the following day	500.00

You are required to set out your reconciliation statement between the balances shown by the cash book and the bank statement as at 31st October.

Marks will be awarded for neatness and clarity.

This is one of the most fundamental of questions. The correct method is to begin with one of the figures to be reconciled, preferable the Bank Statement figure, work through the adjustments to close with the remaining figure to be reconciled. To juggle the figures around in the hope that they will agree earns no marks.

Question 2 (10 marks)

The following Trial Balance is presented to you by the Chief Clerk who asks permission to proceed with producing the monthly accounts –

	DR.	CR.
Head Office Account		20,000
Senior Assistants Current A/c	3,400	
Revenue expenditure		3,424
Capital expenditure	16,430	
Cash at bank	3,421	
Insurance A/c prepaid		4,700
Accrued agents' fees	2,000	
	$25,251	$28,124

State the reasons why you would withold your permission commenting on individual balances where necessary.

The following reasons exist for witholding permission–

1. *The trial balance does not balance. No set of accounts could therefore be accurately prepared.*

2. *The Senior Assistant's current A/c indicates a large sum owing to the estate. The reasons for this should be known.*

3. *How can revenue expenditure be a credit balance?*

4. *The prepaid and accrued accounts appear in incorrect columns.*

Question 3 (25 marks)

The form of cash book used on an estate has columns for both petty cash and bank transaction. On 1st October the balances are as follows –

Cash at bank	$2,490.62
Cash in hand	50.00

The following transactions occur during the month –

Oct. 5 Cash drawn from the bank to pay wages $31,762.50.
7 Manager cashes a cheque for $200.
8 Manager's cheque for $200 is banked.
9 New Tractor purchased for $15,720.

10 Remittance received from Head Office of $50,000.
15 Cash drawn from bank of $100 to replenish petty cash.
17 Entertainment expenses reimbursed to staff out of petty cash – $27.32.
22 Sale of scrap iron received in cash from local buyer – $800.
24 The sum of $500 is paid into the bank by the estate.
28 A staff loan of $200 is made in cash.

You are required to enter the above transactions, including the opening balances, in the cash book and show the balances carried forward at the end of October in the bank and petty cash columns. Marks will be awarded for neatness and clarity.

The essential point here was to set out separate columns for bank and petty cash transactions. The recording of cashed cheques and payment of wages posed problems for some candidates. In the former case, the manager's cheque would be "banked" i.e. entered on the debit side in the bank column; the cash paid to him would be entered on the credit side in the petty cash column. In the latter case the cash drawn for wages from the bank is purely a bank transaction. Hopefully no estate would be unwise enough to have $31,762.50 in its petty cash box!

Question 4 (10 marks)

Explain concisely what the following terms mean:

(a) Ex-estate
(b) Free on board (F.O.B.)
(c) Cost insurance freight (C.I.F.)

This was a fairly straightforward question, candidates either knew the definitions or they did not.

Question 5 (25 marks)

The following transactions concerning the purchase and use of a fertilizer called x occur during the month –

Oct. 1 Purchase 10 tons at $70 per ton
5 Purchase 10 tons at $90 per ton
6 Issue 5 tons to Field 76
10 Purchase 15 tons at $70 per ton
15 Issue 10 tons to Field 77

In addition 5 tons of the fertilizer were stolen from the store on the night of October 26th.

At the beginning of the month there were 20 tons of the fertilizer in stock valued at $100 per ton.

You are required to set out the format of a typical stores ledger account and record the above stock movements in both quantity and value, including the opening of stock, showing the balance after each transaction in quantity and value. The estate uses the average cost method for pricing its issues.

The two important points here were that the question asked for (1) the quantity and value balances to be shown after **each** *transaction and (2) to use the average cost method for pricing its issues.*

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Question 6 (10 marks)

What do you understand by the term "depreciation charge" and how is it shown in the Profit and Loss Account and Balance Sheet of a company?

Depreciation may be defined as the provision for expired capital outlay, made necessary by the permanent shrinkage in value of any asset owing to its use in earning profits. Depreciation arises from wear and tear, effluxion of time, obsolescence, etc. Although there are a variety of ways of calculating it, the simplest is to divide the cost, less an estimate of its residual value, by the number of years it is anticipated that the asset will be used in the business. The resultant annual charge is debited in the Profit & Loss account. The accumulated depreciation is deducted from the original cost to give the written down value for balance sheet purposes. It is worth noting here that the balance sheet is a statement of certain accounts set out in a particular fashion: it is not an account to which items are posted.

GENERAL

Candidates should generally take the hint that if their calculations begin to involve fractions and do not work out cleanly they are almost certainly on the wrong course. The examination is on bookkeeping principles not arithmetic ability.

Again, the importance of reading the question cannot be too highly emphasised. Too many candidates continue to lose marks because they fail to answer the question.

Misconduct and criminal charge

Can a domestic enquiry be held arising out of an offence for which a worker has been charged in criminal court? Generally, yes. The domestic enquiry would be on a charge of misconduct and cannot be equated to a criminal charge.

In Industrial Court Award No. 8/77 the Court cites precedents and authorities to support this. On or about 10th January, 1974 the Police preferred charges against four persons, including the worker concerned, in the Magistrate's Court, Petaling Jaya under the provisions of the Penal Code.

Following an enquiry on 14th January, 1974 the employer, a manufacturing company in Petaling Jaya, notified the worker that the Company was satisfied that the worker was guilty of misconduct inconsistent with the fulfilment of the express and/or implied conditions of his service and dismissed him from service with immediate effect.

On 6th July, 1974, the worker was discharged and acquitted of the criminal offence. There was an appeal to the High Court, Kuala Lumpur, against the acquittal but the appeal was subsequently dismissed. The Award states, in part, as follows:

It was contended by the Company, as a matter of law, that it has a statutory and/or a contractual right to take disciplinary action against its employees for proper cause. It was further contended, that the decision of the Magistrate's Court at Petaling Jaya, arrived at on the basis of the criminal, evidential and procedural laws of the country did not necessarily supercede the purely domestic enquiry conducted by the Company in respect of alleged offences committed against its rules and regulations.

The general view of the law, as followed by this Court in its earlier awards, is set out in the case of *Topo (J.L.) v. Tata Locomotive and Engineering Co. Ltd. (1962) II L.L.J. 398 (Patna)* where the learned Judge observed as follows in the judgement: :

"Where, however, the offence was committed in respect of the property of the company, and the company was satisfied about the misconduct of its servant after proper enquiry and after hearing the delinquent servant, the company will be justified in dismissing him and maintaining his dismissal independent of the result of the criminal proceeding, if any, and his eventual conviction or acquittal will not affect the order of dismissal. If, therefore, the criminal proceeding ends in his conviction by the trial Magistrate and his acquittal by the appellate court, his dismissal cannot be characterised as illegal and wrongful and cannot be set aside, because it was rested on a definite finding by the company which was not affected by his acquittal, unless the entire departmental proceeding is said to be fraudulent and mala fide."

On the question of the holding of a domestic enquiry pending criminal proceedings, this Court has adhered wherever appropriate to the views expressed by the learned Judge in *Tata Oil Mills Co. Ltd. v. Its Workmen (1964) II L.L.J. 113 (119)* which are as follows:-

". . . it is desirable that if the incident giving rise to a charge framed against a workman in a domestic enquiry is being tried in a criminal court, the employer should stay the domestic enquiry pending the final disposal of the criminal case. It would be particularly appropriate to adopt such a course where the charge against the workman is of a grave character, because in such a case, it would be unfair to compel the workman to disclose

the defence which he may take before the criminal court. But to say that domestic enquiries may be stayed pending criminal trial is very different from saying that if an employer proceeds with the domestic enquiry in spite of the fact that the criminal trial is pending, the enquiry for that reason alone is vitiated and the conclusion reached in such an enquiry is either bad in law or mala fide."

Again, in Award No. 30 of 1973 (Industrial Court Case No. 2 of 1973), the learned Chairman made the following remarks:-

"In this connection, it is worthwhile to note that although the Claimant Munisamy is reported to have been acquitted and discharged of the criminal charge relating to the same offence, the Industrial Court can yet hear the Claimant on a charge of misconduct, which cannot be equated to a criminal charge. The standard of proof required is not as high as in the criminal court, where a case has to be proved beyond reasonable doubt. Besides, the rules of evidence are not as strictly observed, e.g. the evidence of Sa'niah (E.W. 1) will not be accepted in a criminal court without sufficient corroboration in material particulars, while the Industrial Court may base its evidence even on her uncorroborated testimony, though in this instance there appears to be sufficient corroboration. Again, no evidence of previous background of a person charged with a criminal offence is allowed to show that he is likely to have committed, it, whereas such evidence cannot strictly be objected to in the Industrial Court from the point of view of social conscience. The Industrial Court, not being a judicial but an arbitral court, is concerned whether the Claimant's misconduct, although not sufficient to establish the elements of a criminal charge, may yet be a serious breach of his contractual obligations with his employer to disrupt industrial peace, thus showing the dismissal as socially justified."

–Majikan Lombong, April 1977.

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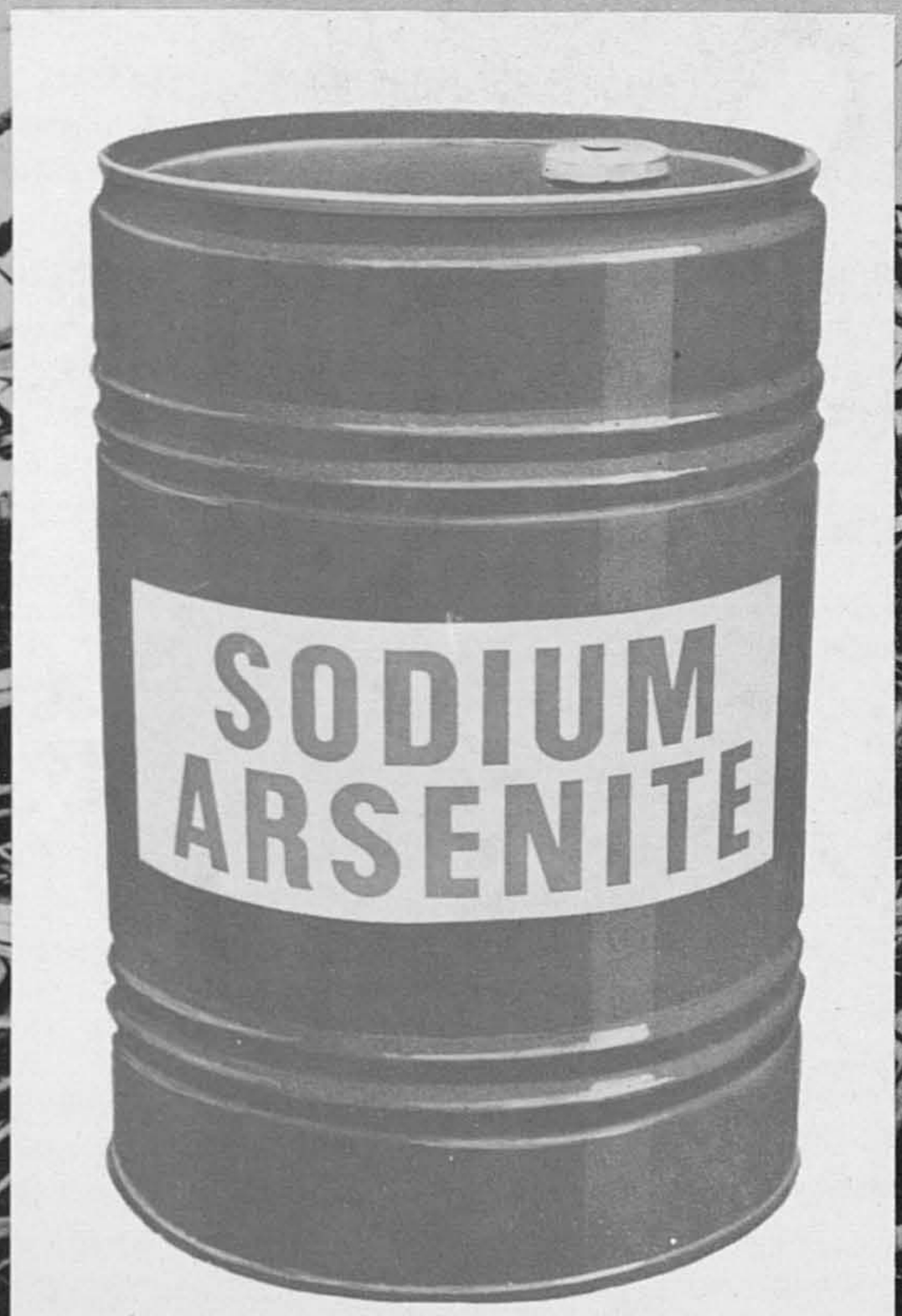

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The monthly crop

First in Selangor. Sime Darby Plantations Berhad by signing an Agreement with the Selangor State Government became the first to implement one of the recommendations of the Government Task Force on Housing and Amenities for Estate and Mining Workers. Under the terms of this Agreement, one hundred and ten single-storeyed terrace houses, costing approximately $8,500 per unit, will be built on a 15-acre site in Tennamaram Estate, near Batang Berjuntai.

Sime Darby will provide the management expertise, the 15-acres of land and $55,000 cash towards the construction-cost of the houses. In addition, they would also pay out in subsidies to the workers/purchasers as monthly allowances $125.00 per month to help them during the repayment of 10 years. The Company will not be treated as a commercial developer since it is subsidising this project, estimated to be ready by the end of the year.

According to Mr. D.M. Gold, the General Manager of Sime Darby Plantations Berhad, the houses will be brick buildings with asbestos roofs, each built on 2,000 square feet of land, with three bedrooms, estimated to cost below $8,500 per unit.

The Government's Revolving Fund managed by the Ministry of Housing and New Villages (Tabung Pusingan) will provide housing loans of $7,500 for each worker/purchaser at 4 per cent interest. The monthly instalment is expected to work out to $77.00 per month over a 10-year repayment period.

The actual cost of the house to the worker/purchaser is $8,000 and $500 of this must be paid when the house is ready for occupation. As soon as an employee signs up for the scheme, he will have to open a savings account to accumulate this minimum down-payment of $500.00.

According to Mr. D.M. Gold, "Home Ownership helps the worker to overcome the retirement problem. Traditionally, as is the current practice on Sime Darby's 39 estates employing 20,000 workers, the Company provides free accommodation. But after retirement, the worker has to move out of the estate unless his/her children are employees of the estate. It is a social problem for the worker who has not saved or planned for retirement and whose children choose not to work and live on estates. Under this scheme, the worker at the end of 10 years, would have his own house and need not depend in his retirement on charity from the former employer, relatives or Social Welfare. So you could say this is a form of social security scheme."

Similar schemes are being worked out by this Company for Johore, Perak and Malacca.

Rubber Out of FEFC General Freight Tariffs. After a dialogue-cum-briefing session at the Malaysian International Shipping Corporation Hqrs in Kuala Lumpur on 14.3.77, Datuk Musa Hitam, Minister of Primary Industries in his statement after this dialogue, stated "The dialogue-cum-briefing was to focus our attention on the interest of the Malaysian primary commodities sector in shipping facilities with particular reference to MISC's role.

"The meeting noted the proposed general freight increase by the Far Eastern Freight Conference of 13.75% with effect from 1st July this year. I have stated categorically that

I oppose the proposed increase as there is no justification for it. Furthermore it would adversely affect the competitiveness of Malaysian produce in general. In the case of *Natural Rubber,* I have directed the MRELB to initiate negotiations to take out this commodity from the FEFC General Freight Tariffs and have a separate merchant agreement for it. This will give Natural Rubber the same status as palm oil and timber which are negotiated outside the General Conference rates. I feel there is a case for such a move for Natural Rubber since the volume involved is very large. In this context, I have also asked the MISC to give its full support for the move.

"Palm Oil: We have expressed general satisfaction with the role which MISC is playing in carrying Malaysian palm oil and that MISC will be expanding its capacity and facilities in line with the expansion of palm oil production and export and the requirement of this sector for improved shipping facilities."

Why be Afraid of Snakes. In his speech at the opening of the Reptiles Exhibition held at Musium Negara, Kuala Lumpur on 11.3.77, Tan Sri Ong Kee Hui, the Minister of Science, Technology and Environment said of snakes "Most people are afraid of them – this fear is instinctive and pyschological rather than based on fact. There is also very little popular understanding of snakes. There are about 5,000 species of snakes in the world, and of these less than one per cent are poisonous. In Malaysia we have the richest snake fauna in the world having at least 180 species so far known. Of these only 21 species of sea snakes and sixteen species of land snakes are poisonous and only about 5% of these poisonous snakes are dangerous to man, the majority of the snakes being harmless. Eighty per cent of the harmless snakes feed mainly on rats, thus most snakes perform a valuable service by preying upon rats. It should be borne in mind that this is of more than economic importance since rats of various species are among the most dangerous reservoirs of disease in the country.

"The potential rate of increase of the jungle and field rats exceeds that of most of the other mammals, and if it were not for these natural predators – the snakes – to help control their excessive numbers, the rats problem would be very much more severe than it is now." Planters are aware of what valuable role snakes play in the control of rats in oil palm estates'.

The Nurturing Forest. Foresters have demonstrated that forests regulate water supplies and thereby reduce the incidence of floods and droughts. Because of the many-storeyed nature of the forest and the accumulated litter deposits on the forest floor, rain is intercepted at many levels on its way to the ground, its energy dissipated, and its impact on the soil reduced. Thus, there is little or no compaction of the soil, its pore spaces do not become clogged, and its infiltration capacity is not diminished as happens when the land is bare.

Forests also actively assist infiltration. The organic matter on the forest floor (leaves, twigs, fruit, branches etc) is first oxidized and hydrolized, then decomposed by fungi and transported into deeper layers by the soil fauna. The combined effect of the chemical and biological action is the conversion of the litter into humus, and humus improves the soil, increases its permeability and aids infiltration.

We know that if most or all of the rain that falls is permitted to run off the surface of the land, the consequences may be far-reaching: drainage systems may not accommodate all the water, and this may lead to severe flooding; water moving rapidly over the surface removes soil material and accelerates erosion; soil materials eventually fill reservoirs, making rivers and streams shallow, and cover farmlands.

On the other hand, forests reduce the possibility of droughts by reducing the overland flow during the rainy season and releasing it more slowly to the springs that feed the streams in the dry season.

Finally, when used as windbreaks and shelterbelts, forests protect the soils, improve their porosity and water-holding capacity and activate microorganisms, thus increasing the effectiveness of certain fertilizers. Indeed, there is considerable evidence that higher yields are obtained with the help of shelterbelts, particularly in areas where growing conditions are difficult.

Obviously, any programme to improve food production should include the reforestation of critical watersheds. This need not be too costly an exercise. Growing forest trees quickly in conjunction with food crops is known as agrisilviculture. This technique promises to provide man with food, with protection for his crops and with wood for industrial development.

Yet, in none of the resolutions passed or recommendations made at the recently concluded World Food Conference was the word forestry mentioned; nor was any reference made to the evils of unscientific deforestation, and the necessity of reforesting many of the world's areas in order to assist in food production.

It is no coincidence that the forests of all the countries with major crop failures in recent years due to droughts or floods – Bangladesh, Ethopia, India, Pakistan, the Sahel countries – had been razed to the ground and had not been replaced by woody vegetational cover.

(Reprinted from *Ceres*, the FAO Review on Development).

Trade Unionism. Datuk Lee San Choon, Minister of Labour and Manpower, in an interview with Malaysian Business (March 1977 issue) is reported to have said that:-

"Trade unionism is here to stay and is growing in strength – economically as well as in numerical strength. History suggests that it will continue to grow over the forseeable future with the increase of working population. This should not be unexpected because it is in line with the Government's policy of encouraging the growth and development of healthy, democratic and responsible trade unions. Some may say that trade unions are only answerable to their members.

However, In a developing economy like ours, where a substantial proportion of the population are not wage earners, the Government would expect Trade Unions to use their strength and power to pursue their goals only after having taken into consideration the likely effect of their action on non-wage earners and to have regard at all times to National Aspirations and Interests".

– *SECA News.*

Domestic Enquiry – Industrial Court Award 19/77. The failure of an enquiring officer at a domestic enquiry to record his findings and the reasons therefor was criticised and the whole enquiry ignored. The Court, in so acting, had recourse to Malhotra's "The Law of Industrial Disputes" Second Edition, Volume II, para 2, page 672 on *Report of Enquiry Officer: General Principles:*

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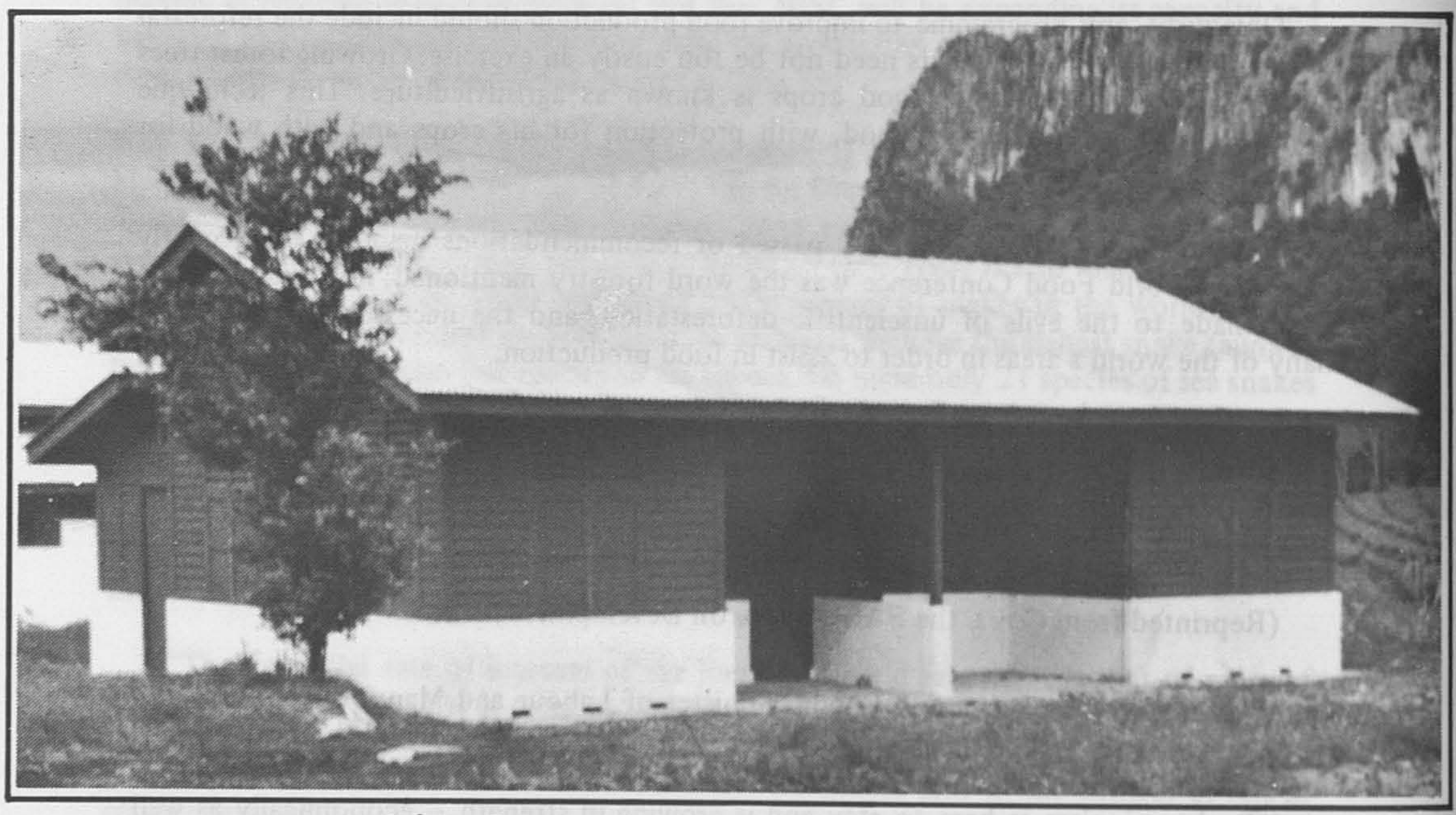

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"The whole object of holding a Domestic Enquiry against a delinquent workman is to enable the Enquiry Officer to decide upon the merits of the dispute before him and such Enquiries must conform to the basic requirements of natural justice and *one of the essential requisites of a proceeding of this character is that when the enquiry is over the officer must consider the evidence and record his conclusions and reasons therefor.* (Powari Tea Estates vs Barkataki (M.K.) (1965) 11 L.L.J. 102, (105) (S.C.) per Gajendragadkar, C.J.). *A mere form of enquiry would not satisfy the requirements of industrial law and protect the disciplinary action taken by the employer from challenge.* (Khardah & Co. Ltd vs Its Workmen) (1963) 11 L.L.J. 452 (456) (S.C.) Per Gajendragadkar, J.). It would, therefore, be wholly misconceived to think that once evidence is recorded, all that the employer is expected to do is to pass an order for dismissal which impliedly indicates that the employer accepted the view that the charges framed against the employee have been proved. In the words of Gajendragadkar, J.: "If industrial adjudication attaches importance to domestic enquiries and the conclusions reached at the end of such enquiries that *necessarily postulates that the enquiry would be followed by a statement containing the conclusions of the enquiry officer".*" On page 674 of the same book, 3rd line from the top reads: *"The failure of the enquiry officer to record his findings and conclusions at the end of the enquiry would, therefore, constitute a serious infirmity in the enquiry itself which would render the enquiry invalid and the Tribunal would be justified to ignore the enquiry.* (Khardah & Co. Ltd vs Its Workmen (1963) 11 L.L.J. 1952 (S.C.) per Gajendragadkar, J.)".

Co-education at Scots/P.G.C.

Where will your son or daughter stand in the 1980's?

Henry Rodger, Principal of Warwick Presbyterian Co-educational Colleges in Queensland, Australia believes that he has the answer. He says he has proof that his co-educational system for secondary school students is already producing young men and women with a high standard of academic achievement, who can face the challenges of the 1980's with a background of high moral and ethical principles and the secure knowledge that they possess a sound and rounded secondary education.

Mr Rodger waxes enthusiastic on the success of his School Council's decision in 1971 to integrate The Scots College and Warwick Presbyterian Girls' College (PGC) into a co-educational environment. He said that results have made nonsense of the old bogey of teenage children of opposite sexes distracting each other from their studies. The social advantages of co-ed have been proved. Boys and girls learn to respect each other as individuals rather than suffer self-consciousness in each other's company.

In true ecumenical style, the Colleges admit students of all denominations and, in fact, are virtually "Christian Community Colleges" rather than pedantically denominational. Rather uniquely, although co-ed, Scots and PGC retain their own historic identities:

The girls live at the site of the original Girls College in a charmingly rambling building set in 12 acres of land behind the colonial-style scrollwork of the Alison de Conlay Memorial Gates at the southern outskirts of Warwick.

The boys live to the east of Warwick at The Scots College upon which the education facilities are based on 40 acres of land.

PGC and Scots each retain their own kitchen and dining room, tennis courts, reference library and evening study areas. The girls are transported the 2 miles to The Scots College daily for their academic and practical education. Boys and girls eat their mid-day meals together at Scots dining room.

School facilities include Modern Classrooms, new Science Block and Library Resource Centre. The grounds at both locations are spacious and attractive and there is ample room for sports and games of all kinds. Further extra curricular activities include Scouts, Cadets, Pipe Band, Highland Dancing, Jazz Ballet, Sailing, Judo, Drama among others, to develop the fuller person. Grade 8 is the initial secondary grade in Queensland, and a common course in the following subjects is offered:

English, French, Mathematics, Science, Geography, History, Social Science and Christian Knowledge, Speech and Drama, Music, Homecraft or Manual Craft, Art, Physical Education and Health. Remedial Reading is carried out with those students who require the training.

A broad selection of subjects is available to Grades 9 and 10. Compulsory subjects are:

English, Geography, Science and Maths A or O.

2 (minimum) or 3 other subjects are selected from:
French or Typing or Metal Work and Woodwork or Homecraft;
History or Trade Drawing;
Art or Applied Biology;
All students receive training in Christian Knowledge/Social Science, physical education and Health.
Shorthand – music – Speech can be fitted into the course if the student desires.
In Grades 11 and 12, 6 subjects are selected from:
English (compulsory)
French or Geometric Drawing or Home Management
Chemistry or Geography
Physics or Economics or Art
Biology
Speech and Drama, Social Maths and Agriculture are also available.

A subject – General Studies – is undertaken by all students. Thus academically and practically, students are well catered for at these Warwick Colleges.

Warwick, an historic town, and the first settled in Queensland outside the original coastal penal settlement of Moreton Bay, nestles in the foothills on the western side of the Great Dividing Range, beside the Condamine River which also flows lazily through the Scots College grounds. The district is renowned for its contrasts in primary production. Grazing pastures cater for herds of sheep and beef cattle. Dairy cattle make their contribution to a thriving dairy products industry; and fertile black soil along the banks of the Condamine produce bountiful crops of wheat, barley and other grains.

The local community is quietly proud of the high standard of academic achievement the Colleges have maintained. They know that few schools can show higher academic standing based on examination on results and success of their students at University and other Tertiary Institutions. Past students have been prominent in a tremendous variety of areas in public and private life – from treading the snows of Kilimanjaro to receiving the accolade of Knighthood.

Present glory is, in part, a reflection of the Colleges' past education efforts, but Mr Rodger, B. Sc., MACE., AIBS., with his feet firmly on the ground, realizes the importance today of individualized training. Accordingly, class sizes are kept to a minimum, and well-qualified teaching staff attend inservice training to keep up with modern thinking in the field of education.

Backed as he is, with an innovative and far-thinking School Council, Principal Rodger is convinced that your son or daughter could stand high in the 1980's if he or she co-educates at Scots/PGC.

For more details, please contact:

Mr Henry Rodger, Principal
Warwick Presbyterian Colleges
Oxenham Street
Warwick,
Queensland
AUSTRALIA 4370.

Uplands School

Easter Term Report

The following circular letter to all parents was sent out on 19th March, 1977:

"The Governors of Uplands have decided, after very careful consideration, that the time has come to move the school to fresh premises in the Pulau Tikus area of Penang.

Their reasons for the proposed move include the fact that the present lease for the Penang Hill site expires at the end of 1977 and, considering the state of the buildings there, it will not be advisable to renew it when, for almost the same rental, a much more substantial property is available down the Hill.

The Governors also took into account the following points:- the economics in both time and money that will be effected by not remaining on the Hill, the widening of cultural and sporting vistas for the children and the possibility of attracting day children. Our first year secondary class is now the largest in the School. Specialist visiting teachers and greater educational facilities will be much more readily available in Georgetown for this rapidly growing section of the school.

The buildings in Pulau Tikus are as follows: a Boarding House at 457 Burmah Road, a Headmaster's house and classrooms in Kelawei Road as well as a most excellent sports field. The Kelawei Road property is the present St. Xavier's Private School. It is appreciated that the children must, of necessity, commute between the two buildings but this is virtually the only disadvantage. The school will make fool-proof arrangements for this commuting and the youngest children will probably travel by school bus. The distance between the two buildings is about 5 minutes on foot.

It is proposed to move to the new site at the start of the Christmas Term, in September 1977.

A. Crawford,
Chairman,
Committee of Management"

In many ways this is sad news but a school, like any other organisation, has to adapt to the times and it is becoming more and more clear that there is less demand for a boarding school education now than there was a few years ago. At the same time it is clear that there is a need for us to provide a Secondary department and many of these secondary age pupils wish to be day pupils.

By moving from the Hill, the School can continue to provide a boarding school education for the children of planters, miners and others. We can also offer a day school education for children of secondary school age.

We have no doubt that by moving off the Hill, the right decision has been taken.

P.E. Drury
Principal

Letters to the Editor

Dear Sir,

Spy in the Sky

As one of the participants in the Seminar on Agricultural Aviation who presented a paper on the relatively new science of remote sensing, including the use of aerial photography, I find your editorial comments in the February 1977 issue, entitled "Spy in the Sky", rather negative, disappointing and possibly misleading. It is indeed surprising that a journal of such stature should base its editorial comments on sensationalised press reports instead of on an objective perusal of the relevant papers presented at the Seminar.

I write this letter not so much to criticise but in the hope of correcting any misconception your comments may have created on the practical value of remote sensing or "snooping from the skies". Even with available technology remote sensing will not only present us with a bird's eye view of a situation but will also reveal to us features, such as crop diseases, insect infestations and nutrient deficiency, before they are visible to the naked eye. Such advance information will undoubtedly contribute tremendously towards crop protection efficiency and effectiveness as well as productivity in general.

In view of the tremendous potential practical applications in agriculture it is hoped that remote sensing will be treated as an ally rather than as an enemy. In this respect it is encouraging to know that the Association of Natural Rubber Producing Countries has recognised the possibility of remote sensing rubber crops and is seeking Dutch technical assistance to initiate the necessary research and development activities. As the development of remote sensing technology and associated data analysis techniques require a multi-disciplinary approach, it is suggested that there should be a concerted and joint effort in research and development so as to reap maximum benefits from the new science of remote sensing.

Yours sincerely,

(S.T. Mok)
Director of Forest
Management.

Editor's note:

We are grateful to the author for the clarification provided but must point out however, that the so-called 'sensationalised press report' has, to the best of our knowledge, yet to be denied by any one, including the author. We only wish the positive and constructive nuances now emerging had, in the first place, been reiterated adequately enough that there could have been no grounds for the now blamed, yet undenied, sensationalised press reports.

Obituary

John Jefferies

It is with great sadness that we record the sudden death of Mr. John Jefferies, Director of Operations for KGSB, who suffered a heart attack in Penang on Saturday, 2nd of April.

John Jefferies – or 'JJ' as he was popularly known – was a fighter pilot with the Royal Air Force during the Second World War and saw service in Burma and Malaysia. After demobilisation he joined Guthries and returned to Malaysia in March, 1947, as an Assistant Planter. He remained with the Company until his death.

John served as an Assistant on Port Dickson Lukut, Bukit Asahan and Pengkalan Bukit Estates, before receiving, in 1952, early promotion to Manager of Pengkalan Bukit, where he served for the next 13 years. He became Manager of Siliau Estate in 1965 and shortly thereafter moved to Kuala Lumpur as a Planting Adviser.

In 1968, following the reorganisation, he became Manager of the Estates Department and was appointed to the KGSB Board. He remained in this position until 1975 when he was made Director of the newly created Operations Division, with responsibility for the overall management of the Group plantations, processing factories and research operations.

During the course of his long career, John Jefferies made a great personal contribution to the Malaysian Plantation Industry and the imprint of his thirty years with the Group will be with us for many years to come. He was active in the Malayan Agricultural Producers Association, The United Planting Association of Malaysia, The Rubber Producers Council of Malaysia, The Oil Palm Growers Council of Malaysia and the Malayan Council of Employers' Organisations. In spite of the heavy demands on his time, he also involved himself in social work as a Rotarian and recently became Treasurer of the Royal Selangor Flying Club.

Those who were privileged to work with him will remember his dedication, his integrity and the high standards he sought always to achieve and maintain in respect of everything that he did.

His sudden death is a grievous loss to all who were close to him, to his many friends, colleagues and associates.

He is survived by his wife and two children to whom we extend our deepest sympathies.

Social and Personal

Births

P. JAYARAMAN : To Jayaraman and Rathamani. Baby boy Sivakumaran – born on 21.2.1977 at Klang Hospital.

KEOY : To Rosalind Low and Eric Keoy, a girl, Theresa Keoy, on 26th February, 1977 at Ipoh General Hospital.

On leave

4159 Buma, W W H, No 6, B W Hopperus Buma weg., Diepenveen (Ov.), The Netherlands.

4614 Chang Choo Chau AISP, London Graduate School of Business Studies, Sussex, London NW1, England.

4595 Nair, K P K, Puthanvelil House, Champakulam P.O, via Alleppey, Kerala, India.

3729 Pirie, A W, c/o Beaconhill Cottage, North Deeside Road, Milltimber, Aberdeen, Scotland.

4397 Tolson, Albert, AISP, 217 Ranelagh Court, Regency Walk, Shirley, Surrey, U.K.

Returned from leave

4508 Dreyer, Jan, North Labis Estate, Labis, Johore.

5462 Mah Siaa Pong, Dip. NRP, AISP, Pasir Gajah Estate, Kuala Krai, Kelantan.

Change of address

6364 Abd Latip b Haji Mohd Zain, CEP Niyor Estate, P.O.Box 514, Kluang, Johore.

6546 Ali bin Musa, Pamol (S) Ltd, P.O.box 203, Sandakan, Sabah.

5712 Arikiah, A, Flemington Estate, Telok Buloh Division, Telok Anson, Perak.

5264 Boey Pak Chuen, Kirby Estate, Labu, Negri Sembilan.

5982 Chan Kim Lye, Ladang Siang, P.O.Box 524, Kota Tinggi, Johore.

5909 Chandrasekharan, K, BSc, AISP, Liew Weng Chee Estate, P.O.Box 201, Bentong, Pahang.

6111 Chow Fook Seng, Bukit Mertajam Estate, Kulim, Kedah.

5628 Foong Mun Chiew, Dow Chemical Pacific Ltd, P.O.Box 711, Hong Kong.

6302 Foo Chee Thong, No. 27, Talang Garden, Kuala Kangsar, Perak.

5451 George, A, Mangalaseril Bungalow, Nangiarkulangara P.O, Haripad, Kerala, India.

4459 Hertslet, L R, AISP, Taiko Plantations Sdn Bhd, P.O.Box 167, Ipoh, Perak.

5098 Ismail bin Mohamed, Flemington Estate, Teluk Anson, Perak.

4817 Kit Thien Looi, Sg Wakuba Scheme, SLDB, P.O.Box 359, Tawau, Sabah.

6054 Kasmuri bin Sukardi, Bukit Benut Estate, Kluang, Johore.

5992 Katar bin Jamin, Kuala Ketil Estate, Kuala Ketil, Kedah.

6141 Kamaruddin bin Ahmad, Syarikat Kurnia Setia Bhd, Ladang Kurnia Setia, P. O. Box 106, Kuantan, Pahang.

5266 Lian Kwen Min AISP, Welch Estate, Jementah, Segamat, Johore.

5766 Lam Sai Yin, Albert, Sungei Mai Estate, Jerantut, Pahang.

5338 Lee Kim Tong, Ayer Manis Estate, Bakri, Muar, Johore.

5497 Lim Jit Jee, Bristol Estate, Kuang, Rawang, Selangor.

5422 Lim Hong Joon, Kekayaan Estate, P.O.Box 103, Paloh, Johore.

4879 Mohd Damanhuri b Hj Mohd Ibrahim, Ladang Perbadanan Kedah, Sungei Petani, Kedah.

6608 Mohd Yusoff Hj Musa, Majlis Tempatan Batu Anam, Segamat, Johore.

3854 Murray, L G, AISP., 9 Maungawhare Place, Tauranga, New Zealand.

4313 Menon, C.M. c/o Regional Controller's Office, Kemuning Estate, Tebong, Malacca.

4408 Machado, P L, Kumpulan Guthrie Sdn Bhd P.O.Box 2516, Kuala Lumpur.

6484 Ng Bak Chai, Kuala Gris Estate, Kuala Krai, Kelantan.

6238 Nagaratnam, M, West Estate, Carey Island, Port Kelang, Selangor.

5353 Ong Cheah Yee AISP, Pahang Oil Palm Estate, Sri Jaya, Maran, Pahang.

3700 Ridler, E C, 42 Dial Hill Road, Clevedon, Avon BS21 7NE, England.

5089 Ramakrishnan, S, BSc (Agri), Scarboro Estate, Sungei Patani, Kedah.

6614 Rozlan Abdul Halim, Rubana Estate, Teluk Anson, Perak.

6380 Rosley Abdullah, No. 42 Jalan Anggerik (S), Taman Mesra, Batu 13, Kajang, Selangor.

1737 Shotter, R A S, OBE PJK AISP, 23 Stonebridge Close, Marlborough, Wilts SN8 2AE, England.

6578 Sivapathy, M, Lanchang Estate, Lanchang, Pahang.

6443 Tay Thian Teck, Air Putih Estate, P.O.Box 19, Kemaman, Trengganu.

5315 Tan Keng Hean, 8 Jalan Chendera, Serene Park, Johore Bahru.

6317 Tan Cheng Han, Tony, 41 Jalan Unta, Taman Bukit Raja, Kelang, Selangor.

6514 Tan Han Chor, Asia Oil Palm Estate, Sri Jaya New Village, Nr Maran, Pahang.

5083 Watt Yiew Fye, Mentakab Estate, Mentakab, Pahang.

6555 Yap Swee Fatt, 15 Bibby Road, Raub, Pahang.

5603 Yow San Yong, Albert, Kajang Estate, Kajang, Selangor.

Culinary Treasure

VEGETABLE RICE
To serve: 6 – 8 persons

Ingredients

4 tablespoons cooking oil
4 tablespoons margarine
1½ kati rice
3 medium size kembung fish
1 coconut – to be grated
5 pandan leaves
2 shallots
2 pips garlic
8 small red chillies
2 tablespoons vinegar
Yellow colouring or saffron
Salt and sugar to taste

Garnish

1 cucumber
5 string beans
10 kesum leaves
15 pieces cashewnut leaves
5 lemon grasses
5 tahils bean sprouts

} cut into strips and serve

Method

Wash and cook rice as usual, adding in margarine and a dash of yellow colouring or saffron. Bring rice to boil and add in pandan leaves. When rice is cooked set aside.

Coconut Paste

Fry grated coconut in cooking oil till golden brown. Pound this coconut till fine and set aside. Grill fish till cooked. Scrape off fish flesh and keep aside. Pound shallots with sugar and salt. Add in fish flesh and pound till well blended. Then add in coconut and mix well. Remove to plate and serve.

Chilli Paste

Pound chillies finely. Add in vinegar, a little water and salt, stirring well till salt is dissolved. Serve chilli paste in a saucer.

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