The Planter

Published by the Incorporated Society of Planters, 1 Pesiaran Lidcol, Kuala Lumpur 04-06. JANUARY 1977
Printed by United Selangor Press Sdn. Bhd., 8 & 10, Jln. Lengkongan Brunei, Pudu, K.L. KDN 10411 Vol. 53, No. 610

The Planter

KDN 10411

MAGAZINE OF THE INCORPORATED SOCIETY OF PLANTERS

VOL. 53 JANUARY 1977 No. 610

Publishing office:

I Pesiaran Lidcol
Kuala Lumpur 04-06
Malaysia

Postal address:

P.O. Box 262
Kuala Lumpur 01-02
Malaysia

Telephone: 86396/209705

Telegrams : ISPLA

Price: M$3.00

Annual subscription : M$36.00

SENTIASA MAJU

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.

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	During the calendar year in which eligibility for membership occurred and the 4 succeeding calendar years.	Subsequently
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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 2,100 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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3 or 4 colours		$480	$450
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Editorial:

"RING IN THE NEW!"

Christmas and New Year are apt moments for a tired world to 'ring out the old, and ring in the new' .... they also give the most ideal opportunity to mend fences and spread 'peace on earth, and goodwill among all men'.

To the planting fraternity in Malaysia, especially those who are members of our Society, New Year 1977 will have an added significance – it may well be the year when we settle down in the surroundings of our own home, the new headquarters of the Society.

A hardworking group of veterans, headed by Councillor G.C. McCulloch, made the boldest move yet during 1976, by successfully negotiating to acquire a building for the Society.

Reactions to the proposal to purchase a building have ranged from all-out support in admiration to fears based on the much appreciated note of caution. Nevertheless, the need for a suitable headquarters for the Society is becoming increasingly urgent with every passing day and this may be our finest hour, figuratively speaking, if we can take due advantage which we intend to for, 'there is a tide in the affairs of men which, taken at the flood, leads on to fortune; omitted, all the voyages of their life is bound in shallows and in miseries ....'. Applied to the Society, especially in the light of the generous offer of assistance from the Rubber Growers' Association and the spontaneous support of the members, this is an opportune moment for us to forge ahead with the purchase of our building. Needless to say, if we miss this, the enthusiasm may wane and the project may have to be abandoned.

With ringing in of the New Year, we have to actively pursue some of the schemes and projects which we have embarked on earlier, the major ones being Housing Loans for Planters and the Cooperative Society. Last but not least, it is necessary, during the course of the year, for members to 'go all out' to consolidate our financial position for only with a sound financial position can we venture into new fields.

Though, somewhat belated, we wish all our readers, a Prosperous 1977!

S.E.A.

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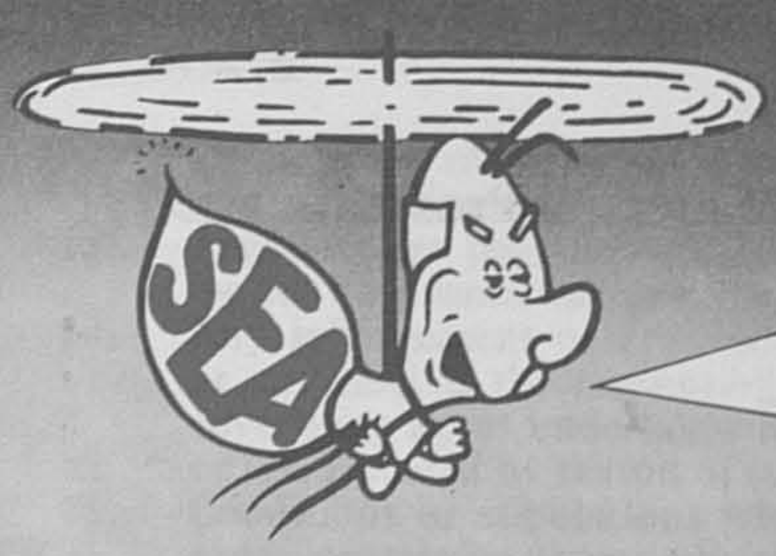

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Planter, Kuala Lumpur 53 : 2 - 9 (1977)

Potential of palm oil mill effluent as feed for growing-finishing pigs

R.I. HUTAGALUNG, C.C. CHANG, K.M. TOH & H.C. CHAN*

SUMMARY

Two types of processed palm oil mill effluent referred to as *censor tk8* (35% palm oil sludge, 32.5% cassava root meal, 32.5% palm kernel cake) and *tkg* (32% palm oil sludge, 34% cassava root meal, 17% palm kernal cake, 17% grass meal), were evaluated in pigs. Both censor meals replaced the 50 or 100% maize fraction in a conventional maize-soyabean ration.

The rate of gain of pigs fed 50% *censor tk8* or *tkg* diet, was relatively the same, but their feed intake and feed per gain ratio were significantly higher than those of the control. At 100% replacement of maize by either *censor tk8* or *tkg*, the performance was significantly poorer than that of 0 and 50% *censor* diets.

No substantial differences were observed in the carcass characteristics measured.

An analysis of cost showed that it is economical to replace 50% maize with *censor tk8* or *tkg* which gave a saving of M$0.02 per pig per day in feed and a higher extra dollar benefit of M$0.08 and 0.01 per kg gain, respectively.

The oil palm industry is one of the major revenue-earning industries in Malaysia. Throughout the years, there has been a steady increase in acreage under oil palm cultivation and in the Third Malaysian Plan, further land and oil palm schemes are projected.

In the process of palm oil extraction, the major waste product, sludge effluent is discharged into nearby rivers. This effluent is a highly polluting, having a B.O.D. (Biological Oxygen Demand) of 20,000 ppm which is 100 times higher than that of raw sewage *(Olie and Djeng, 1971)*. When discharged into rivers, it competes with the natural fauna for oxygen resulting in low depletion of the natural fauna and deterioration of the quality of the water for domestic uses.

The estimated Malaysian production of 1 million tons of palm oil per annum in 1975 probably released about 2.25 million tons of effluents into streams and rivers *(Olie and Djeng, 1971)*. This amount will increase to 4 million tons or more by 1978 *(Webb et al., 1975)*, when the present plantings come into production. From these figures, it is clearly shown that the pollution problem will become increasingly serious.

Many researchers have proposed different methods for treatment of the effluent, such as aerobic purification and anaerobic digestion *(Olie and Djeng, 1971)* and biodegradation *(Stanton, 1974)*. However, these are either impractical or uneconomical. *Webb (1975)* approached the problem of dehydration of effluent using mechanically dried cassava meal and palm kernel meal as absorbent for the sludge. This system aims to develop a saleable by-product from palm oil mill waste, by producing a high quality feed for livestock, with a projected potential market value of M$300 per ton.

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*Faculty of Agriculture, University of Malaya, Kuala Lumpur, Malaysia.

With the widely fluctuating prices that have existed during the past 3 years for feed grains and high protein meals, particularly maize and soybean meal, there is a need for intelligent decision-making with regard to the selection of appropriate economic alternative to soybean meal or maize to meet nutrient requirements.

Recently, considerable attention has been focussed on utilizing these waste products because of the future likelihood that animal feed resources may require expansion. Also, utilization of some of these wastes by animals may be a solution to disposal problems *(Rajagopalan and Webb, 1975; Webb et al., 1976)*. Some of the work has been concerned with assessing chemical or physical treatments of the products to make the nutrients more readily available *(Gustafson et al., 1971; Raghavan et al., 1974)*. Other efforts have been made to establish their nutrient values *(Creswell and Brooks, 1971; Sauter et al., 1974)*.

The objective of the present experiment was to assess the effect of replacing maize by processed palm oil mill effluent in pigs. In addition its economic aspect was studied.

EXPERIMENTAL PROCEDURE

Fifteen pigs of about 6 weeks of age of the commercial crossbred (Landrace X Hampshire) were purchased from a local farm[1] for this experiment. The experimental diets referred to as either *censor tk8* or *tkg* had components of palm oil sludge, cassava root meal and palm kernel cake at 35, 32.5 and 32.5%, or 34, 17, 17 and 32% of cassava root meal, palm kernel cake, grass meal and palm oil sludge, respectively, were prepared at the Agricultural Engineering Division, Faculty of Agriculture, University of Malaya *(Webb, 1975)*. The pigs were reared on a commercial prestarter diet[2] (20% CP; 3.3 kcal DE/g) and were then fed with the control diet (18% CP; 3.2 kcal DE/g) containing 50% maize for a period of 2 weeks before being allocated to the experimental diets. A randomized complete block design with three replications per treatment was used. The pigs were assigned on the basis of body weight, equalizing both mean weight and distribution among five groups. All diets were formulated isonitrogenously (16% C.P.) and isocalorically (3.2 kcal DE/g). Cost of feeds and composition of diets are given in Tables 1 and 2. Water and feed were offered *ad libitum*. Individual body weight and feed consumption were recorded weekly. The trial lasted 12 weeks.

At the end of the experimental period, the pigs were slaughtered[3] and carcass data were obtained. After chilling for 24hr. various cuts[4] were undertaken and measured accordingly.

Data were statistically analyzed by the various methods described by Steel and Torrie (1960). Significant differences between means were compared using the new Duncan multiple range test *(Duncan, 1955)*.

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[1] Kan Gerh Farm, 29-A New Village, Subang, Selangor, Malaysia.

[2] Zuellig Feedmill (M) Sdn. Bhd., Jalan Bersatu, Petaling Jaya, Selangor, Malaysia.

[3] Central Abattoir, National Livestock Development Authority, Shah Alam, Selangor, Malaysia.

[4] Cold Storage, No. 3 Jalan Benteng, Central Market, Kuala Lumpur, Malaysia.

Table 1. Price of ingredients on the Peninsular Malaysia market, August, 1975

Ingredients	*M$/100 kg*
Corn	42.08
Censor tkg[1]	30.00
Censor tk8[1]	30.00
Soybean	54.45
Rice bran	28.88
Leaf meal	28.88
Fish meal	57.75
Molasses	16.50
Crude palm oil	46.75
Salt	16.50
Kaolin	7.50
Tricalcium phosphate	18.15
DL-Methionine	400.00
L-Lysine	670.00
Mineral premix[2]	70.00
Vitamin premix[3]	2200.00

[1]Webb *et al.* (1975)

[2]Biostok, ST5, I.C.I., Malaysia

[3]Dohyfral plus premix, Philips-Duphar B.V., Amsterdam, Holland.

Table 2. Composition of experimental diets

	Treatments				
Ingredients, %	*1*	*2*	*3*	*4*	*5*
Maize (8.5% C.P.; 3.61 kcal D.E./g)	50.00	25.00	–	25.00	–
Censor tk8 (8.3% C.P.; 2.85 kcal D.E./g)	–	25.00	50.00	–	–
Censor tkg (9.6% C.P.; 3.1 kcal D.E./g)	–	–	–	25.00	50.00
Soybean (44% C.P.; 3.3 kcal D.E./g)	15.00	15.10	15.20	14.35	13.75
Rice bran (13.5% C.P.; 3.26 kcal D.E./g)	10.00	10.00	10.00	10.00	10.00
Leaf meal (17% C.P.; 1.44 kcal D.E./g)	5.00	5.00	5.00	5.00	5.00
Fish meal (55% C.P.; 2.99 kcal D.E./g)	5.10	5.10	5.10	5.10	5.10
Molasses (2.9% C.P.; 2.46 kcal D.E./g)	5.00	5.00	5.00	5.00	5.00
Palm oil (8.95 kcal D.E./g)	2.55	4.65	6.70	4.21	5.85
Tricalcium phosphate	2.20	2.20	2.20	2.20	2.20
Salt, iodized	0.25	0.25	0.25	0.25	0.25
DL-Methionine (99%)	0.10	0.10	0.10	0.10	0.10
L-Lysine (98%)	0.10	0.10	0.10	0.10	0.10
Mineral premix[1]	0.25	0.25	0.25	0.25	0.25
Vitamin premix[2]	0.05	0.05	0.05	0.05	0.05
Kaolin	4.40	2.20	0.05	3.40	2.35
Total	100.00	100.00	100.00	100.00	100.00
	Calculated analysis				
Protein (N x 6.25), %	16	16	16	16	16
D.E., kcal/g	3.2	3.2	3.2	3.2	3.2
Cost, M$/100 kg	44.75	42.60	40.45	42.08	39.42

[1]Contributed the following per kg of diet: Fe, 35.17 mg; Cu, 1.01 mg, Mn, 3.46 mg; Zn, 5.80 mg; Co, 0.21 mg; I, 0.20 mg and Mg, 17.19 mg.

[2]Contributed the following per kg of diet: vitamin A, 2,500 IU; vitamin D_2 5,000 IU; vitamin B_2 15 mg; vitamin B_{12}, 8 mcg and pantothenic acid, 40 mg.

RESULTS AND DISCUSSION

Performance. Results (Table 3) showed that substitution of maize by 50% *censor tk8* or *tkg* did not significantly ($P < 0.05$) affect gain, but significantly ($P < 0.05$) affected feed consumption and feed efficiency. Replacement of maize fraction by *censor tk8* or *tkg* at 100% level, depressed ($P < 0.05$) gain and feed efficiency. No significant differences were observed for feed intake between 50 and 100% substitution by *censor tk8* or *tkg.*

Comparing the performance of pigs fed the five diets, the slowest rate of gain was observed in pigs fed 100% *censor tk8* or *tkg* diet. This may be due to increased level of cassava fraction of the *censor* meals in the diets. Earlier findings *(Peixoto, 1965; Hew and Hutagalung, 1976; Maust et al., 1972)* showed that a corresponding increase in the cassava level resulted in slower weight gains. Likewise, the lower weight gain of pigs fed the 50 and 100% *censor tk8* or *tkg* diets could be due partly to their higher crude fibre level. Slower growth rate of pigs resulted from the use of lucerne leaf meal *(Kovesdy 1967).* Baskett *(1969)* also stated that with additional crude fibre in the diet, reduction in weight gain occurs. In pigs no deleterious effects from feeding 50 and 100% *censor tk8* diet were observed. Locomotion symptoms have been associated with lack of calcium and phosphorus *(Chapman et al., 1962; Miller et al., 1962, 1964; Brown et al., 1966),* vitamin D *(Miller et al., 1964)* and copper *(Teague and Carpenter, 1951).* The chemical composition of sludge and censor products shows that it contains sufficient amounts of these minerals *(Hutagalung et al., 1975).*

Table 3. Performance of pigs fed censor-tk8 and censor tkg

		Percent of ration contribution by				
		Control	*tk8*		*tkg*	
Item	*Maize/censor*	*50/0*	*25/25*	*0/50*	*25/25*	*0/50*
Avg. daily intake (kg)		2.09^{a}	2.15^{b}	2.15^{b}	2.19^{b}	2.13^{d} 2.13^{b}
Avg. daily gain (kg)		0.64^{c}	0.66^{c}	0.56^{d}	0.63^{c}	0.54^{d}
Feed/gain		3.26^{e}	3.46^{f}	3.84^{g}	3.49^{f}	3.99^{g}

Values in the same row followed by different letter are significantly different ($P < 0.05$).

Carcass characteristics. No significant differences were noted in the carcass weight (Table 4) indicating no adverse effects arise from feeding *censor tk8* or *tkg* diets. Substitution of maize with 50% *censor tk8* or *tkg* slightly increased the carcass weight, but at 100% substitution level by *censor tk8* or *tkg,* carcass weight decreased, compared to that of pigs on 50% *censor tk8* or *tkg* and control diets. Considering the cassava portion of this *censor* diets, these findings were similar to those of Hew and Hutagalung (1976) who reported no significant influence on carcass weight with increased cassava levels.

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nt requirements in young palms must be constantly available. With conventional compound fertilizers, ncy of up to 22 rounds is required in a 10-month nursery to obtain the best possible results. Otherwise, uneven growth, higher plant mortality and poor planting material can be expected.

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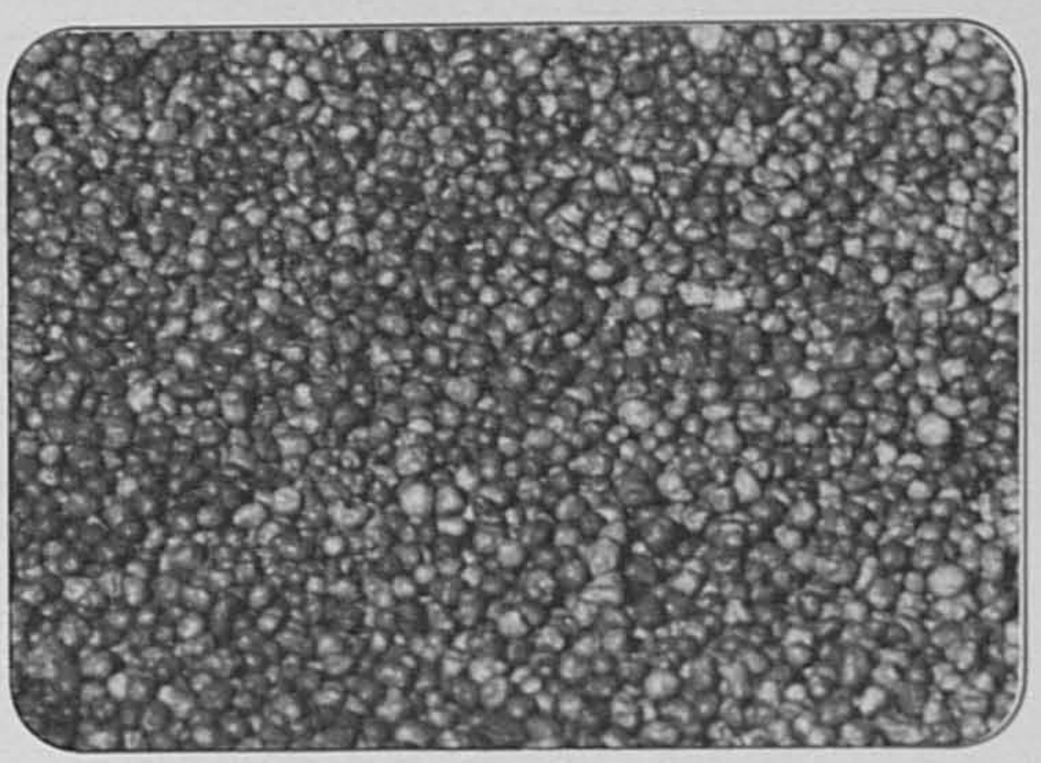

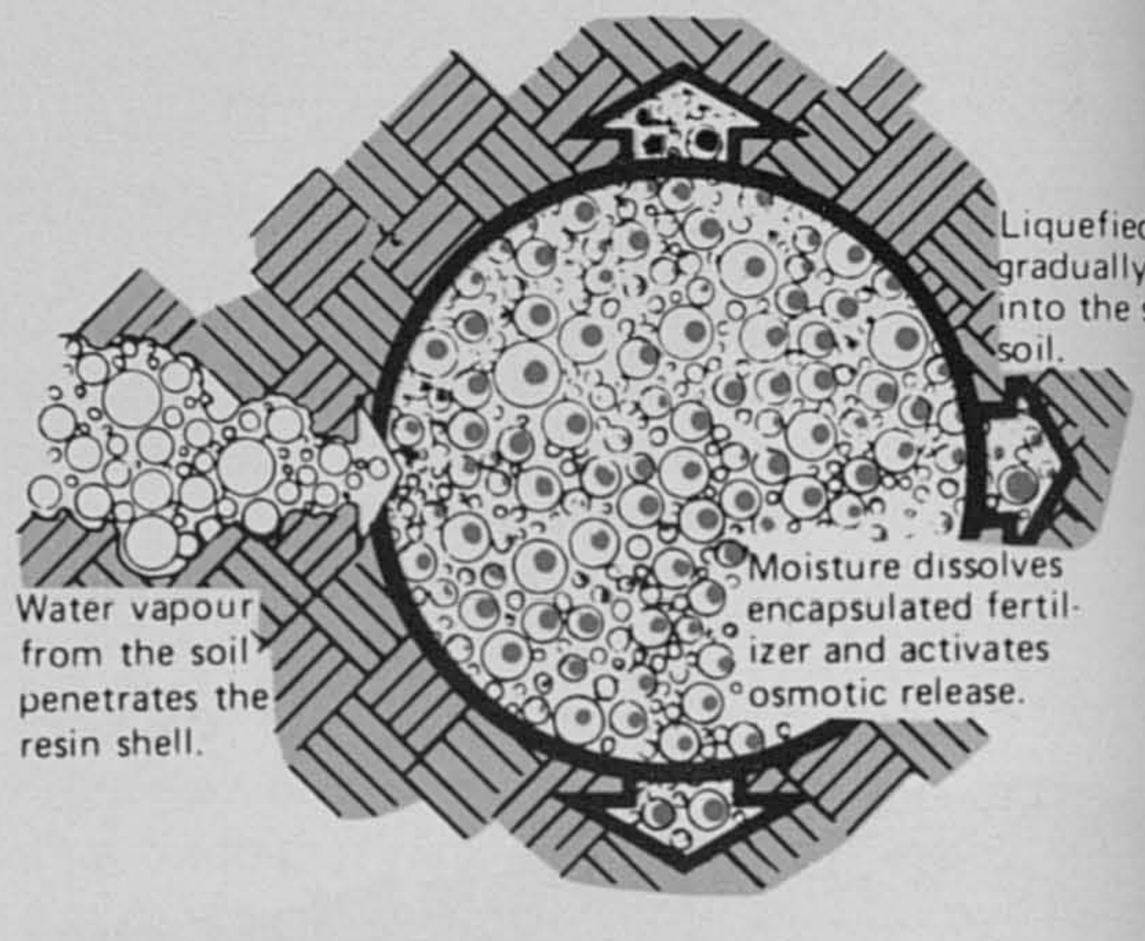

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When Osmocote is placed in or on top of the soil, its polymeric capsule is penetrated by wate vapour from the soil which forces its way into the nutrient core. The granules swell into tiny reservoirs of liquid plant food which begin automatically to meter predictable amounts of nutrients into the surrounding soil. Soil temperature is the major variable which affects the ra of release of nutrient.

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- Eliminates danger of scorching.
- Tremendous labour savings.

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Table 4. Effects of censor-tk8 and censor-tkg on the carcass traits

		Percent of ration contributed by				
		Control	*tk8*		*tkg*	
Item	*Maize/censor*	*50/0*	*25/25*	*0/50*	*25/25*	*0/50*
Live wt (kg)		70.99	69.78	68.19	70.19	66.02
Viscera wt (kg)		8.04	7.40	7.40	9.05	7.70
Adjusted live wt (kg)		62.95	62.38	60.79	61.14	58.37
Chilled carcass wt (kg)		46.74	45.11	43.18	46.48	42.49
Backfat thickness (cm)		2.39	2.34	2.26	2.22	1.95
Carcass length (cm)		64.50	73.66	73.82	73.80	72.58
Loin eye area (cm^2)		19.76	19.95	18.76	17.53	18.64
Ham. % of carcass		31.70	33.01	31.58	32.30	35.09
Boston butt and picnic, % of carcass		24.85	23.55	23.96	25.30	23.27
Loin and belly, % of carcass		3.33	33.24	33.66	32.30	32.96
Yield, % dressing		65.84	64.65	63.33	66.23	64.32

In dressing percentage, no significant differences were observed. However, pigs fed 50% *censor* showed a slight increase in dressing percentage but beyond this level, reduction in dressing percentage prevailed. Considering the effects of the cassava portion of the *censor tkg* diet on dressing percentage, the non-significant differences in dressing percentage obtained generally agree with the findings of Hew and Hutagalung (1976). However, the increase in crude fibre level of the *censor* diets might affect the dressing percentage. Hochstetler *et al.* (1959) stated that with increasing fibre levels in swine diets, there may be a marked decrease in dressing percentage. Similar findings were also reported by Kovesdy (1967) when the fibre level was increased.

With increased levels of *censor tk8* or *tkg,* a reduction in carcass length resulted, although it was not significant compared to that of the basal diet. This is probably due to the fact that pigs fed *censor tkg* had poorer gains.

No significant observations were made on backfat thickness. However, with increasing replacement of maize by the *censor* product, there was a slight reduction in backfat thickness. A possible explanation may be due to the lower carbohydrate content of the *censor* diets compared to the basal diet. For fat deposition, excess carbohydrates of fats are required. It has been found that incorporation of increasing levels of cassava as a high energy feed in swine diets increased backfat thickness *(Hew and Hutagalung, 1976).* However, the *censor* diets containing a relatively high fraction of cassava might not be excessive to cause fat deposition. A decrease in backfat thickness or fat deposition also resulted in diets with increasing crude fibre content *Hochstetler et al., 1959; Larsen et al., 1960; Handlin et al., 1961).* Although there was increased crude fibre level in the *censor* diets, its role in decreasing fat deposition is doubtful at these low levels of *censor.*

No significant difference was observed on the loin eye area, although pigs fed 50% *censor tk8* or *tkg* has larger loin eye areas than those on the basal and 100% *censor tk8* or *tkg* diets. This may be due to slightly smaller size and the slower gains in weight of the animals.

Pigs with larger *longissimus dorsi* area on the 50% *censor tkg* or *tk8* diet tended also to have leaner carcasses. This indicated that the protein from the sludge can be highly utilized and that the total protein is well distributed in the animal, resulting in maximum development of the lean tissues.

Economic aspect. The costs and returns for all treatments are based on the performance of pigs for 12 weeks. The cost per kg feed was calculated based on the price of feed ingredients at time the experiment was conducted (Table 1). The cost per kg feed and the cost of feed per kg weight gain are shown in Table. 5.

Table 5. Cost analysis of the experimental diets

	Percent of ration contributed by				
	Control	*tk8*		*tkg*	
Item *Corn/Censor*	*50/0*	*25/25*	*0/50*	*25/25*	*0/50*
Cost of feed (M$/kg)	0.45	0.43	0.41	0.42	0.39
Av. daily feed intake (kg)[1]	2.09	2.15	2.15	2.19	2.13
Av. daily feed cost (M$/pig)	0.94	0.92	0.88	0.92	0.83
Save in feed cost as compared to control (M$/pig/day)	–	0.02	0.06	0.02	0.11
Av. daily gain (kg)[1]	0.64	0.66	0.56	0.63	0.54
Cost of production (M$/kg)[2]	1.47	1.39	1.57	1.46	1.54
Cost reduced as compared to control (M$/kg)	–	0.08	- 0.10	0.01	- 0.07

[1]Refer to Table 3

[2]Excluding cost of pig, management, labour and depreciation.

Study of the costs and returns in this trial showed that it is economical to feed pigs with diets supplemented with *censor tk8* and *tkg*. Higher profits can be envisaged from large scale operation because of a better system of management and because bulk purchase of the feedstuff can substantially reduce production costs.

As shown in Table 5, 50% *censor tk8* and *tkg* gave a larger cost reduction of M$0.08 and 0.01 per kg gain, respectively, than that of 100% *censor tk8* or *tkg* (M$–0.01 and – 0.07). Total cash expenditure on feed was the slowest for 100% *censor tk8* or *tkg* diets giving the highest saving in feed expenditure of M$0.06 and 0.11 per pig per day and that of 5% *censor tk8* or *tkg* was M$0.02, compared with the control. Although high in feed expenditure saving, 100% *censor tkg* or *tk8* does not justify better production because of its low extra dollar benefit compared to the control. Thus, 50% *censor tk8* or *tkg*, which giving M$0.02 saving per pig per day in feed and a higher extra dollar benefit of M$0.08 and 0.01 per kg gain can be recommended for use by pig farmers. Lower outlay will reduce the risks of losses which may be due to fluctuating prices from time to time.

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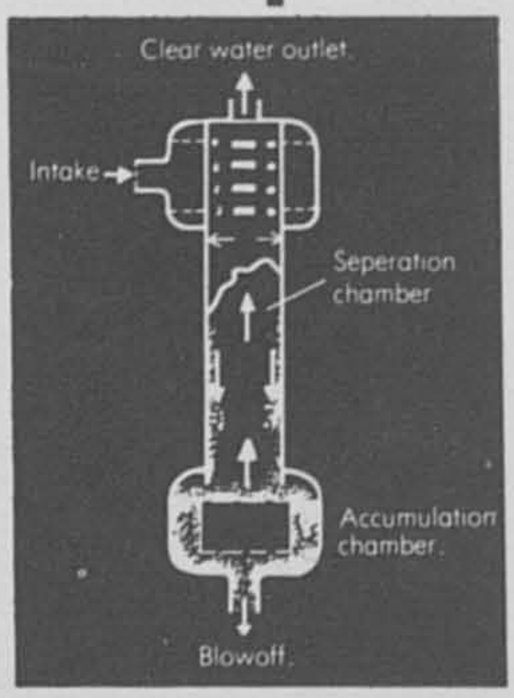

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Methods of sewage disposal and regulations governing estates sewage disposal+

A. SEKARAJASEKARAN

SUMMARY

Sewage disposal in estates has been governed by the Ministry of Labour on the recommendations of the Medical Officers of Health. There have been no set standards and this has created problems recently where the approving authorities have requested methods of disposal which varied widely. This paper is designed to briefly present past regulatory practices, proposed legislation in the field of sewage disposal, new methods of sewage treatment, its disposal and their advantages. The effects of improved methods of disposal on health; the aesthetics of the modern system; and effects on the economy of plantations. Calls for support from the managements for the need of higher standards of living in line with improvements in the overall economy are also discussed.

INTRODUCTION

Waste disposal in communities has always presented problems since the beginning of life on this planet. When man was a cave dweller, as soon as the wastes of his way of living accumulated beyond what he could endure he either moved to a new location or was destroyed by disease. This is evidenced by the remains in caves found by archaelogists.

The problems of sewage disposal in Malaysia today are much the same whether they be in the urban conurbations, rural areas or even estates and mines. Wherever there is a concentration of population, unless there is an organization and effective work to deal with wastes generated by the community, hazards to health will develop, especially in the form of enteric diseases.

The process of development and industrialisation is often gratifying since it provides a basis for a higher standard of living, housing, education, public health and social and economic benefits. However in a developing country like Malaysia the funds allocated for development of public utilities and especially sewerage have been low. This is because the sewerage and sanitation sector of public utilities has to compete with other urgent, more obvious and attractive needs like water supplies, transportation and housing. The less attractive subjects of sewage, underground sewers, and garbage have been forgotten or put aside.

PAST PRACTICES

Methods of sewage disposal on estates vary depending upon ownership, location and other factors. Where estates are owned by well-established companies the use of septic tanks has been common for executives' housing and this type of treatment is often extended to estate labourer common toilet facilities. In other cases pit latrines of widely varying types and quality are

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

provided. The quality of sanitary maintenance of all types of facilities has varied from good to that of complete neglect.

Generally night soil (excreta) and sullage water (kitchen, bath, and laundry wastewaters) are separated, with only the night soil going to septic tanks and pit latrines etc. The sullage water has been almost universally discharged to open earth drains or in some cases concrete drains, discharging to the nearest waterway. Effluents from septic tanks usually drain to the same open channels. These practices have led to considerable contamination of the living quarters and downstream areas, as sullage waters are often heavily polluted with disease causing bacteria; septic tank effluent itself is heavily contaminated.

In some cases the bucket system has been used to serve labour lines. The sanitary deficiencies of this system are well known. Disposal of collected nightsoil by burial has usually been to selected land areas.

The supervision of sanitary maintenance of toilet facilities, septic tanks, pit latrines, conservancy systems, and drains has been usually left to estate management. Maintenance standards have therefore varied widely depending upon the energy, capability and sanitary knowledge of the estate managers.

In general the above described practices were more or less satisfactory for their time but changes in worker standards, more intense land development and pressure on resources, and the evolution of better methods has in a large measure rendered these practices obsolete and uneconomic for future application.

PAST AND PRESENT ROLE OF THE MEDICAL OFFICER OF HEALTH IN ESTATES AND MINES, OF WEST MALAYSIA

Generally the activities of Medical Officers of Health in Estates and Mines have been closely associated with sanitation in and around labour lines, estate, hospitals and nurseries and the prevention of communicable diseases among the working population.

The Ministry of Labour and Manpower, previously known as the State Labour Department administers the Rump Labour Code (Cap 154 of the Federated Malay States). There are similar laws for the Non-Federated Malay States and Strait Settlements. The State Commissioner of Labour and Manpower and his officers operated these laws. The Medical Officers of Health are gazetted as Health Officers under the Rump Labour Code and section 70(i) of the same Code provides the power of entry at all reasonable time upon any estate, factory or mine where labourers are employed, and to put questions concerning such labourers to their employers or to any person who may be in charge of them or the labourers themselves. There are also provisions under the Rump Labour Code for the Medical Officer of Health

to direct or order the employer or the resident manager to (i) remove the sick labourer to hospital (ii) isolate cases of infectious and contagious disease (iii) provide transport to sick labourers to hospital (iv) carry out vaccination of labourers (v) daily examination of labourers at line site by a responsible person or dresser (vi) special medicine, preparations and diet for sick labourers (vii) equipment and apparatus (viii) regulate the visits made by the visiting medical officer to estate and mine hospitals and (ix) sanitation of estate and mine hospitals with particular reference to sewage disposal. He may also (i) regulate sanitary inspection and supervision of labour lines and surroundings and order measures to be taken to prevent the propagation of mosquitoes (ii) order the closing or filling up of an unwholesome source of water supply to labour lines; and (iii) authorise responsible persons to administer medicine. Apart from the above there is also provision where should it appear to the Medical Officer of Health that insanitary conditions exist within the labour lines or in the surroundings which may endanger health, he shall submit a report together with his recommendation to the Commissioner of Labour for enforcement.

In the pre-war and early post-war periods there was close liaison and co-operation between the local Health Department, Labour Department and the management of estates and mines. During those early days malaria and other communicable diseases were rampant among the labour population. The industries had to introduce anti-malarial and other sanitary measures to control these diseases in order to prevent the industries from being paralysed through the fatal and debilitating effects of the diseases and to ensure economic growth.

In the past the activities of Medical Officer of Health in relation to estates and mines revolved around these provisions in the Rump Labour Code functioning mainly as an adviser to the Commissioner of Labour and providing the necessary supportive service for enforcement. The regular inspections of estates and mines were carried out by Public Health Inspectors on behalf of Medical Officers of Health. The nature of inspections and examinations carried out with reference to sanitation were:

(1) Sanitary inspection of labour lines and surroundings

(2) Inspection of source of water supply and the distribution system

(3) Taking of water samples for biological and chemical analysis

(4) Inspection of refuse and excreta disposal

(5) Sanitary inspection of estate and mine hospitals with regard to disposal of soiled linen, excreta, water supply, washing facility, kitchen facility etc.

(6) Physical examination of school children and infants in the nursery for skin diseases, ulcers, etc.

(7) Sanitary inspection of nursery.

The post-merdeka period saw rapid development in the national health services. Improvements in road communication in the rural areas, establishment of hospitals, main health centres, midwife clinics, the effective control of malaria and other communicable diseases has inevitably reduced the incidence of sickness among the labour population in estates and mines. The present activities of the Medical Officer of Health in relation to estates and mines are practically nil. It would not be wrong at this point to mention that the Medical Officer of Health has not played an active role in carrying out his obligations under the Rump Labour Code due to his commitments to other, newer health programmes. As a result the Commissioner of Labour and Manpower is playing a more active role in this respect. However, if the need arises the Medical Officer of Health is requested to inspect and report on health problems in estates.

LEGISLATION

1. *Street Drainage and Building Act 1974.*

The Street, Drainage and Building Act 1974 is an enabling legislation passed in Parliament in 1974 to amend and consolidate the laws relating to street drainage and building in local authority areas. As several estates and mines may fall within local authorities or controlled areas, the buildings and facilities such as roads, water supplies and sanitation will come under the local authority control. Among the by-laws that have been prepared under the Street, Drainage and Building Act 1974 are the Drainage, Sanitation and Plumbing By Laws. These by laws include the construction of small sewage treatment works and the sanitary disposal of waste. The section relating to this is at *Appendix 1.*

With the integration of local authorities under the Local Govt. (Temporary Provisions) Act 124 as in Penang and Melaka, many estates and mines would automatically come under the jurisdiction of the extended local authority and the provisions of the By Laws of the Street, Drainage and Building Act 1974 are applicable.

2. *'Waters' Enactment Cap 146*

The 'Waters' Enactment Cap 146 was originally enacted to control the physical use of water in streams and channels and the construction of waterways and other hydraulic works. In 1970 due to the effects of industrial wastes on water courses, the Federal Government amended the 'Waters' Enactment Cap 146 to provide for pollution control of the waterways. In the amendment, pollution is defined very broadly to include all discharges that may affect the physical, chemical or biological properties of the waterways and reads as follows:

(a) any poisonous, noxious or polluting matter that will render or is likely to render or contribute to rendering such river or part

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thereof harmful or detrimental or injurious to public health, safety or welfare, or to animal or vegetable life or health or to other beneficial uses of such river; or

(b) any matter which by virtue of its temperature, chemical or biological content or its effect in discolouring the waters makes or contributes to making such river or part thereof a potential danger to public health, safety or welfare or to animal or vegetable life or health, or affects other beneficial uses of such river.

(c) for purpose of this section the word "river" is deemed to further include:

(i) any inland waters whether or not such inland waters fall within the definition of "river" in section 2;

(ii) any subterranean water resources; and

(iii) any water in an estuary or sea adjacent to the coast of the State.

Therefore the provisions of this ordinance may also be used to control the wastes discharged by a community.

3. *Environmental Quality Act 1974.*

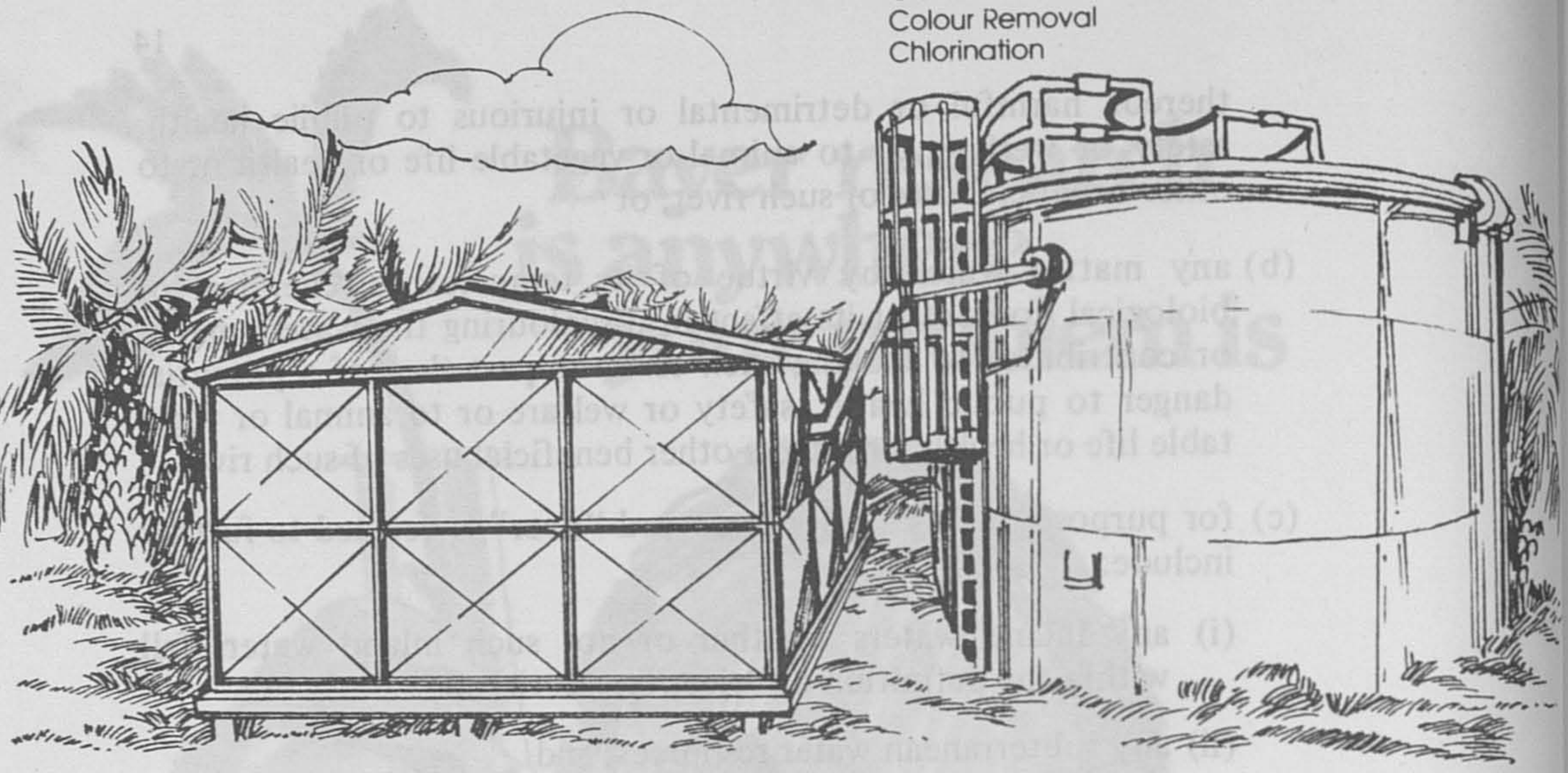
The Environment Quality Act, 1974, is an enabling legislation relating to the prevention, abatement, control of pollution and enhancement of the environment and for purposes connected therewith. Although this Act may be interpreted to deal with wastes generated by industrial concerns it also includes provisions for dealing with wastes generated by the community, as the definition of pollution means any direct or indirect alteration of the physical, thermal, chemical, biological or radioactive properties of any part of the environment by discharging emitting or depositing wastes so as to affect any beneficial use adversely, to cause a condition which is hazardous to public health, safety or welfare or to animals, birds, wildlife, fish or aquatic life, or to plants or to cause a contravention of any condition, limitation, or restriction to which a license under this Act is subject.

4. Thus it can be seen that there is no lack of legislation to support implementation of activities directed towards improvement of sewage disposal on estates. The need is for steady, progressive application of existing laws as a cooperative effort by health officials and estate managers.

METHODS

1. *Sewage collection*

In conformity with the new Street, Drainage and Building Act of 1974 and its sanitary by-laws, all sanitary wastewaters including both sewage



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(excreta or nightsoil) and sullage are to be included in a single plumbing system. For existing buildings with separate plumbing for sewage and sullage waters this presents something of a problem which will undoubtedly be gradually resolved with time.

The use of closed, buried pipe systems to collect sanitary wastewaters from building plumbing systems and convey them to a suitable location for treatment is the only satisfactory and sanitary method available. Where distances between buildings to be served (and associated population density) are not great, piped systems are also the cheapest method of collection. Normally for "net" population densities of from 15 to 25 or more per acre, piped systems will be cheaper in annual costs than separate building septic tanks. In addition the general built-up area will be more sanitary and attractive. Sewerage systems usually are designed to flow by gravity but pumping is often essential where there is insufficient natural slope to the land.

2. *Sewage treatment stabilization ponds versus septic tanks*

One of the traditional methods of treatment for relatively small flows of domestic waste has been the septic tank. Of late, however, the use of ponding, or lagooning which provides a higher degree of treatment has been gaining in popularity as an alternative method. This is especially true as the design flow increases. Costs of excavation, material, etc. increase rapidly with increased size of septic tank. In the case of a number of septic tanks in a small area, economies of scale can be realized by joining the sewerage system and delivering the waste to a centralized treatment facility i.e. stabilization pond.

Let us now investigate the treatment efficiency of the pond relative to the septic tank. We might look to the two parameters most crucial to environmentalists; removal of BOD, and removal of pathogens.

Firstly, removal of BOD. The most efficient, mechanical plants in the highly industrialized nations treat their wastes using two processes; aerobic for the liquid phase, and anaerobic for settleable solids. This division of labour, as it were, has been found from experience and experiment to be the most efficient way to treat domestic waste.

We find this same division of labour in a typical 'facultative' stabilization pond which has an anaerobic lower section (for settleables), and an aerobic upper section (for the rest). We can design wholly aerobic or anaerobic ponds, but the so-called 'facultative' pond, described above is the most common and in most cases the most efficient and easy to operate.

Now consider a septic tank. It is a wholly anaerobic system, thus the reduction of BOD in the liquid with time is less than it would be in pond treatment, in which the upper, liquid, layer is maintained aerobic. This

brings us to the time factor. The longer we hold a waste in our treatment system, the longer the system has to reduce the BOD of that waste. Because it is so much easier to construct a pond than to construct a septic tank, it can be made substantially larger, thus having a longer detention time, and thus greater BOD reduction, than a septic tank of equal expense. Even neglecting the slower rate of degradation in the septic tank.

By the same rationale, removal of bacterial pathogens is greater in the pond environment, in that bacterial reduction is a function of time in an unfavourable environment and the longer the time, the fewer are the bugs left at the end. This effect is then compounded by the bactericidal effect of certain components of sunlight, algae, etc. so that the bacterial reduction (pathogens included) is far better for the pond than for the stabilization pond.

The pond also treats all of the wastewater – sewage (excreta) as well as the equally contaminated sullage which has not normally been treated in the septic tanks.

The effects of improved methods

The effects on health of proper waste collection and treatment, as well as the effects on the economy of plantations are discussed below.

Obviously, if the occurrence in treated effluent of bacterial pathogens is reduced, the occurrence of diseases caused by those pathogens will be reduced. Further, from the standpoint of water pollution control, even those bugs not generally classified as pathogens (or disease-producing organisms) such as the coliform group, members of which are presently eating away in the intestines of everyone at this conference, may cause infections in bathers and other water users. A greater bacterial reduction will also reduce incidence of such infections.

Last, but not least, is the improvement in the aesthetic quality of the environment, which can have a tremendously beneficial effect on the attitudes, or mental health of those associated with the environment. An important factor is that contaminated wastewaters no longer provide a breeding ground and food source for insect disease vectors such as mosquitoes, flies and cockroaches etc., and rodents which bring the contamination back to man from open drains and septic tanks.

With regard to the economy of plantations, use of sanitary sewer collection systems and stabilization pond treatment, as against open drains and septic tanks, will as we have noted result in reduced overall cost per person or unit served, while at the same time providing a higher degree of treatment and a healthier environment. Where expansion of housing is necessary it becomes relatively simple to extend the collection system and increase the capacity of the ponds. The proposed system thus results in a more pleasant

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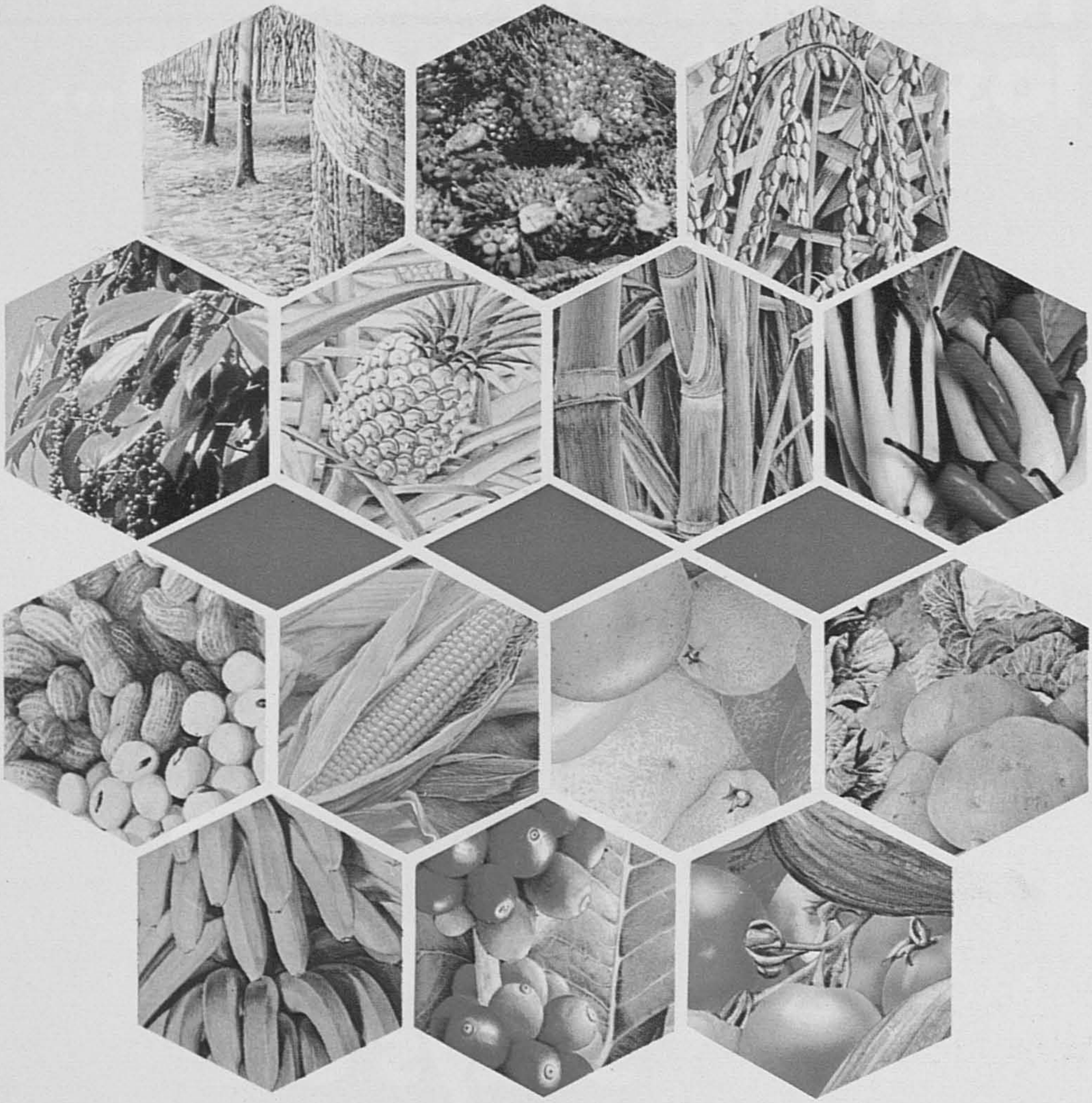

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environment and improved health and satisfaction of workers and their families, and indirectly, in a more efficient plantation work force.

DISCUSSION AND CONCLUSIONS

The need for higher standards of living in line with improvements in the overall economy.

With the increase in the overall economic output of a country, a higher standard of living is realizeable and this is reflected in man's need for an improvement in his residential environment. One of the prime factors that go to make a healthy environment is the efficiency of the sanitary services, as these have a profound effect on man's health. Many studies throughout the world have revealed that the provision of wholesome water in the home of man will cut down the incidence of waterborne diseases considerably, but if there is to be a further decrease in the incidence of enteric diseases then the wastes generated by the community will have to be sanitarily disposed of and this specifically refers to contaminated domestic wastewaters, including sewage (night soil and urine) and sullage.

The education of the public and especially the young will have a profound effect on the level of sanitation. This alone will not suffice as it is necessary for estate management to build sanitary facilities and also teach the people how to use them. It is recognized that the larger estate managements have done this in the past as one can see evidence of this. But this is not always true in the case of the less-organized estate managements and it is therefore necessary for legislation to be brought into force from time to time to ensure that there is support for better sanitary practices.

The need for improved environmental sanitation with special reference to sewage disposal is recognized as one of the most important health problems and is given high priority in preventive health programmes in the Ministry of Health. There can be no appreciable improvement in the health status in estates until effective action on environmental sanitation is undertaken. Neglect of this problem would and probably will contribute to ill health among the workers and their families and impede the economic development of the estates. This will interfere with the quality of life which the government is trying to achieve, and which is the ultimate objective of the development effort.

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ESTATE ENGINEERING & MECHANIZATION CONFERENCE 1975

The following articles which were published in the preceding issues of *The Planter* were not acknowledged as papers presented at the ISP Conference on Estate Engineering & Mechanization 1975. The omission is regretted.

August, 1976

Building economics on estates.

September, 1976

Specification for civil engineering materials and construction in estate engineering.
Quality painting means better protection plus decoration.

November, 1976

Malaysian timber for estate use.

December, 1976

Planning and implementation of an estate water supply.

Notes of discussion will be included with each paper in cases where they are available and is of sufficient relevance to warrant publication.

Editor

APPENDIX I

PART VII

SEPTIC TANKS

Location of septic tank.

7.1 No septic tank shall be located within 100 ft. of any spring, stream or well, the water from which is used or is likely to be used for drinking or domestic purposes or for the manufacture or preparation of articles of food or drink for human consumption or for the cleansing of vessels used in the manufacture or preparation of such articles.

Design of septic tank

7.2 Save insofar as provision is made therefore in these By-Laws, every septic tank shall comply with the standard designs as provided in plan attached.

Capacity

7.3.1 Every septic tank shall have such minimum capacity as shall be determined by the Local Authority in the manner prescribed by paragraph (2):

7.3.2 Provided that no septic tank shall have a capacity of less than 400 gallons.

7.3.2 The septic tank shall be of such capacity as to be capable of storing the quantity of soil discharged thereto during any one day.

7.3.3 The quantity of soil discharged shall be calculated at the rate of 40 gal. thereof for each day for each person using or likely to use the soil fitments installed in the building for which the septic tank is provided.

7.3.4 For the purpose of this By-Law, the number of persons using or likely to use the soil fitments installed in any building shall be determined by the Local Authority.

Construction

7.4.1 Every septic tank shall–

(a) have a depth of liquid of not less than 4 ft. but not more than 6 feet.

(b) have a width not less than 2ft. 6 in.

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(c) have a length not less than two or more than three times its width;

(d) have a clearance of at least 9 in. between the surface of the liquid in the tank and the roof of the tank.

(e) be provided with adequate opening for the inspection and cleansing of each chamber; and

(f) be so located as to allow desludging the tank by means of desludging tankers.

7.4.2 Every inlet pipe into and outlet pipe from a septic tank shall be provided with inspection chambers or manholes of adequate size for purposes of inspection and cleansing.

7.4.3 The sides of every septic tank shall be constructed of–

(a) brickwork in cement mortar not less than 9 in. thick;

(b) concrete Grade III not less than 4 in. thick; or

(c) other approved durable material not subject to erosion or decay.

7.4.4 The foundation and floor of every septic tank shall be constructed of concrete Grade III not less than 6 in. thick.

7.4.5 All internal faces (including the floor) of every septic tank shall be–

(a) rendered in ¾ in. thick sulphate resistant cement mortar; or

(b) faced with other approved material, so as to provide a smooth, impervious surface.

Compartments

7.5.1 Septic tanks may be constructed with two or more compartments. In two-compartment tanks the capacity of the first compartment shall be not less than a half nor more than two thirds of the total capacity.

7.5.2 The division wall in two-compartment tanks shall have openings with least dimension of 4 in. and total area of at least 25 sq. in. Openings shall be located at mid-depth liquid.

7.5.3 The division wall shall have a vent or vents formed through in at the level of the underside of the roof to allow free passage of gas.

Dip pipes

7.6.1 The inlet to and the outlet from every septic tank shall be by means of dip pipes of such depth as to avoid disturbance of the top scum.

7.6.2 Without prejudice to the generality of paragraph 1 of this By-Law, the inlet pipe,

(i) shall be 3 in. above the invert of the outlet pipe.

(ii) the inlet device shall enter at least 12 in. and the outlet device 15 in. to 18 in. below the liquid level and each shall project not less than 6 in. above the flow line, and

(iii) the inlet and outlet dip pipes shall be made of cast iron or other approved material.

7.6.3 All tanks shall be designed to allow the sewage to enter at one end, and have a slow uniform horizontal flow through the tank, and discharge the sewage effluent at the other end with the least possible disturbance of the tank contents.

Ventilation

7.7.1 In every septic tank the space between the top of the water level and the underside of the cover shall be–

(a) adequately ventilated; or

(b) provided with adequate means for drawing of gases.

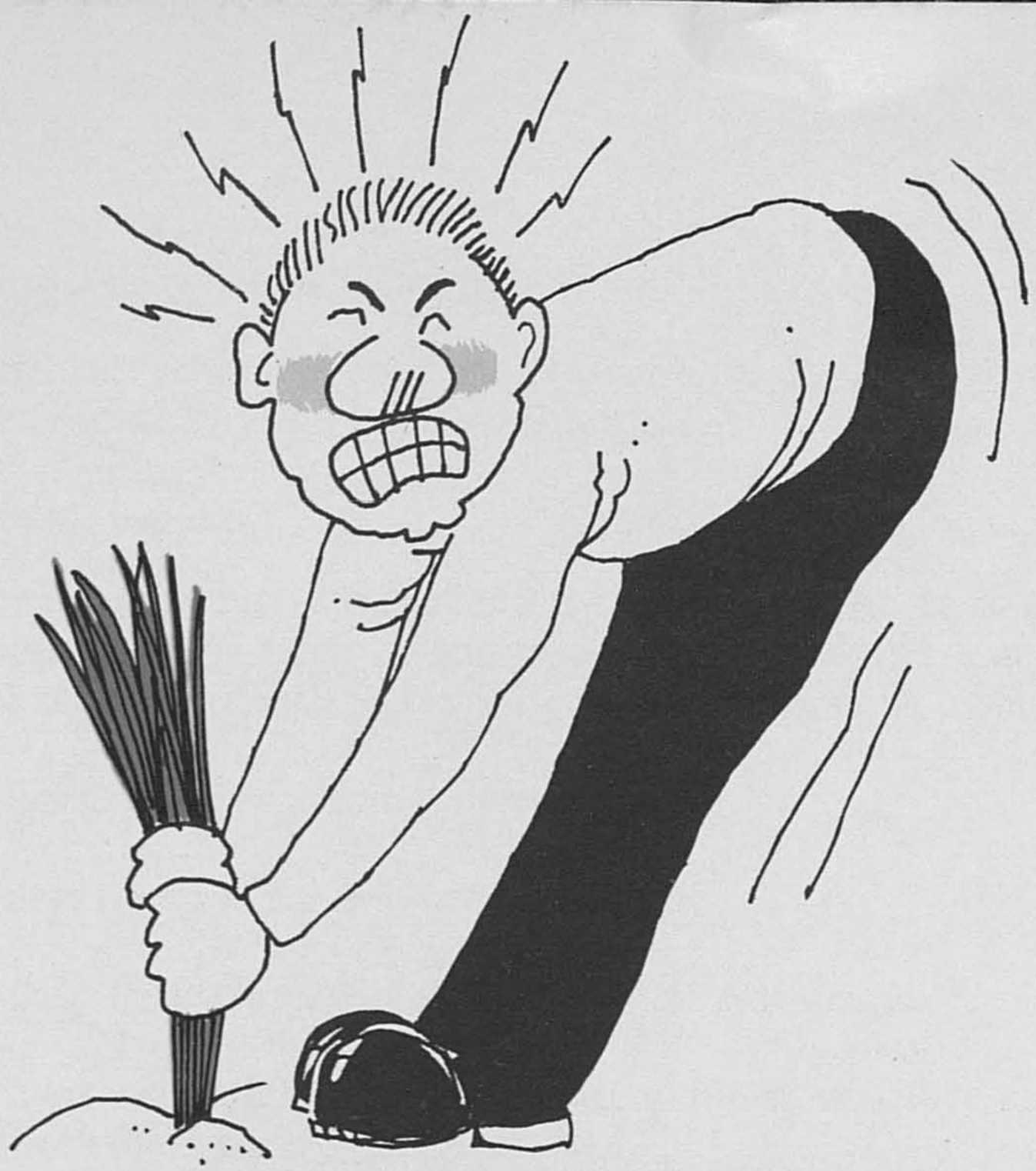
7.7.2 Any pipe or approved ventilation provided in a septic tank shall be proofed against the entry of mosquitoes by means of a fine gauze copper screen or ball.

Tank roof

7.8 The roof of the septic tank shall be adequately reinforced and access shall be provided through it to the inlet and outlet devices and for emptying the tank by the provision of adequate openings.

Airtight cover for openings.

7.9.1 Openings of all septic tanks shall be provided with close airtight cover of cast concrete or metal equipment conforming to the relevant MS or BS and capable of being lifted by two men. Each cover shall be flush with the roof and shall be provided with non-projecting or folding steel lugs for lifting.



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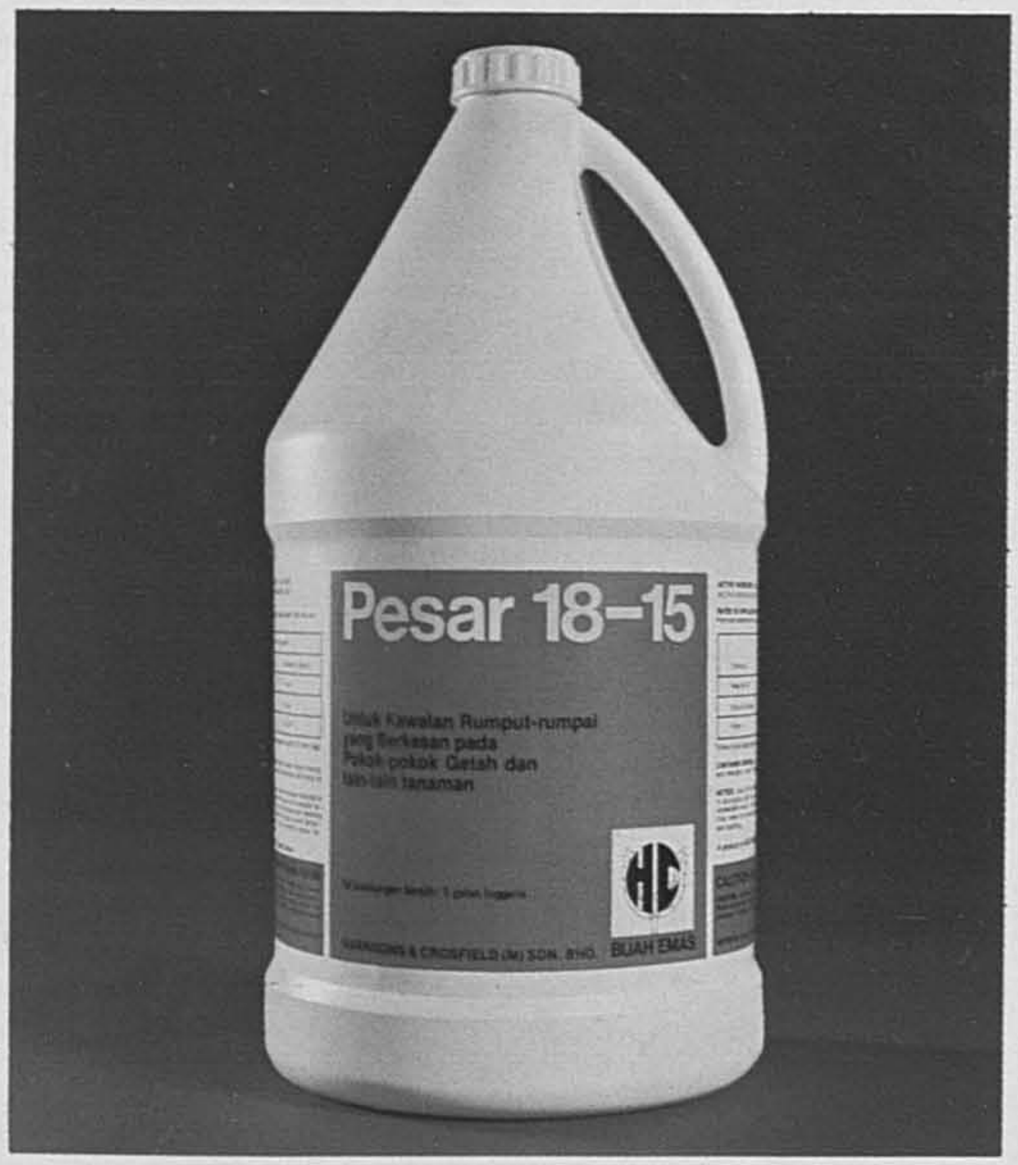

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Treatment and disposal of septic tank effluent

7.10 The effluent from all septic tanks shall be treated and disposed of in a manner to be decided by the Local Authority.

Methods of effluent disposal

7.11.1 The methods of treatment and disposal of septic tank effluent. shall be determined on the basis of location soil permeability and ground water conditions including depth to the water table and shall be by means of:

(i) Trickling or percolating filters, or

(ii) Filter trenches for non-urban areas, or

(iii) Other methods approved by the Local Authority.

7.11.2 In urban areas trickling or percolating filters or other approved secondary treatment methods shall be permitted.

Trickling or percolating filters

7.12.1 Trickling or percolating filters shall be rectangular or circular in shape.

7.12.2 The capacity of the filters shall be two times the capacity of the septic tank.

7.12.3 The depth of filter shall not be less than 4 feet.

7.12.4 The filtering media shall consist of single size media of a top layer of not less than 2 ft. in depth composed of clean broken stones of 2 in. in size. The lower layer shall be composed of clean broken stones of 4 in. in size. The filter media shall be inert resistant to biological attack, durable and not flaky.

7.12.5 The floors and walls of filters shall be constructed of brickwork, concrete Grade III or other non-porous material.

7.12.6 The system of distribution of septic tank effluent over the filter bed shall be:

(i) For septic tanks of capacity exceeding 500 cu. ft. the distribution of effluent shall be accomplished by means of dosing syphon with automatic movable distributors.

(ii) For septic tanks of capacity more than 200 cu. ft. but less than 500 cu. ft. a dosing syphon or tip trough with static distributors shall be provided.

(iii) For septic tanks of capacity less than 200 cu. ft. be by means of a satisfactory system of distribution. Dosing syphon or tip trough need not be provided.

7.12.7 All tip troughs and static distributors shall be made from aluminium sheets gauge No. 13 or other non-corrosive material approved by the Local Authority.

7.12.8 All trickling and percolating filters shall have a false floor arranged to provide free drainage and ventilation.

7.12.9 The false floor shall be constructed of

(a) perforated concrete or vitrified tile slabs.

(b) narrow concrete or brick blocks, or

(c) half round tile or concrete pipes laid with open joints or slotted in the sides.

7.12.10 The under drainage system shall be so constructed as to collect the effluent from the bed in lateral and main drains and to permit air to pass upward or downward through the bed. The under-drains shall be self cleansing or accessible for cleaning.

Filter trenches

7.13.1 Filter trenches shall be built in soils which are tight and impervious (clayey soils).

7.13.2 The loading rate of filter trenches shall be 40 sq. ft. of filter surface per person.

7.13.3 The trenches shall be:

(a) a minimum of 4 ft. depth.

(b) a maximum of 4 ft. width, and

(c) shall not exceed 100 ft. in length.

7.13.4 (a) The filtering media shall consist of three layers. The top and bottom layers shall each be made of 12 in. thick clean broken stone of single size media of 2 in. in size. The intermediate layer shall consist of clean coarse sand to a depth of 24 in.

7.13.5 A sheet of building paper or tar paper shall be laid over the upper layer of coarse media and the trench shall be backfilled and rammed with selected earth fill.

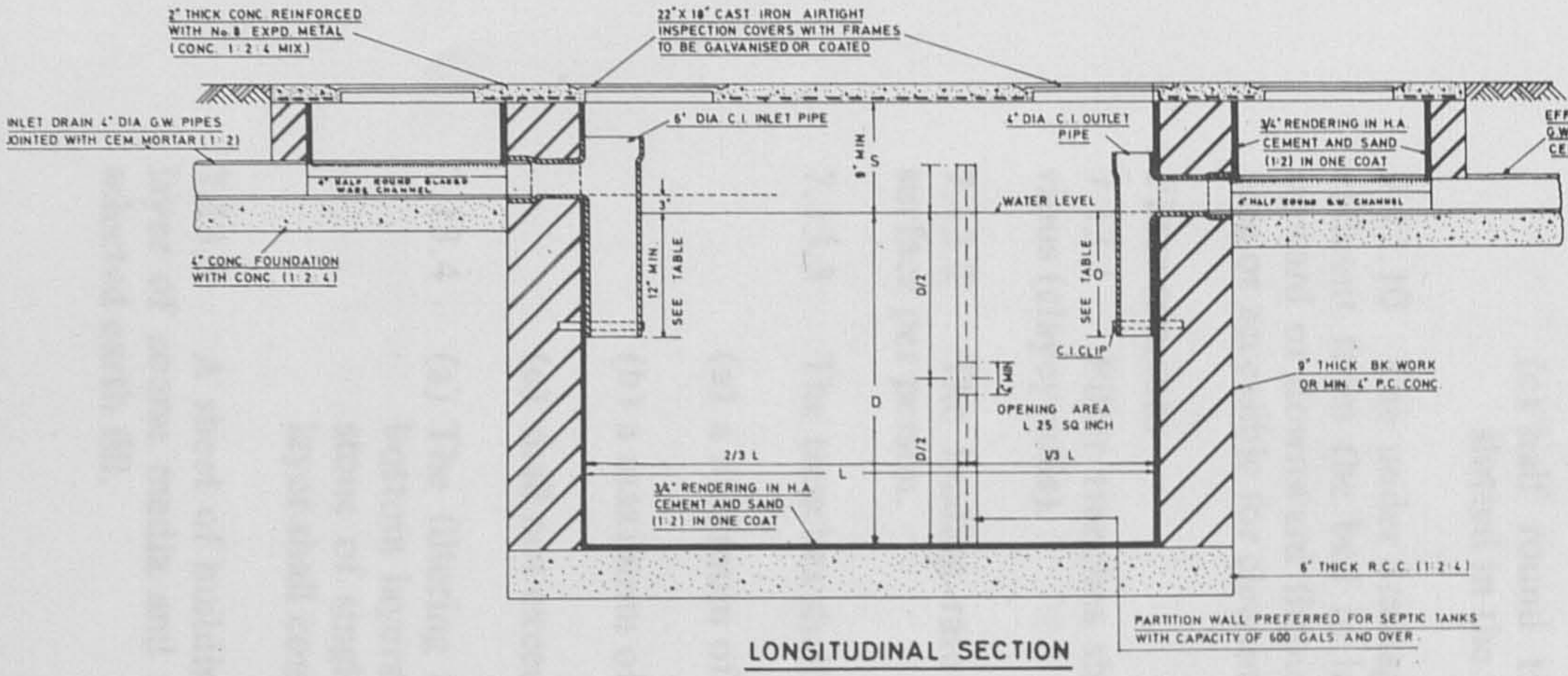
7.13.6 The effluent distribution and under-drainage, in filter trenches shall be accomplished by the use of plain-end tile pipes or other approved sewer pipes with a minimum diameter of 4 in. and 12 – 24 in. in length laid open jointed to approved grades in the centre of the top and bottom layers of the coarse media.

Disposal of filtered effluent

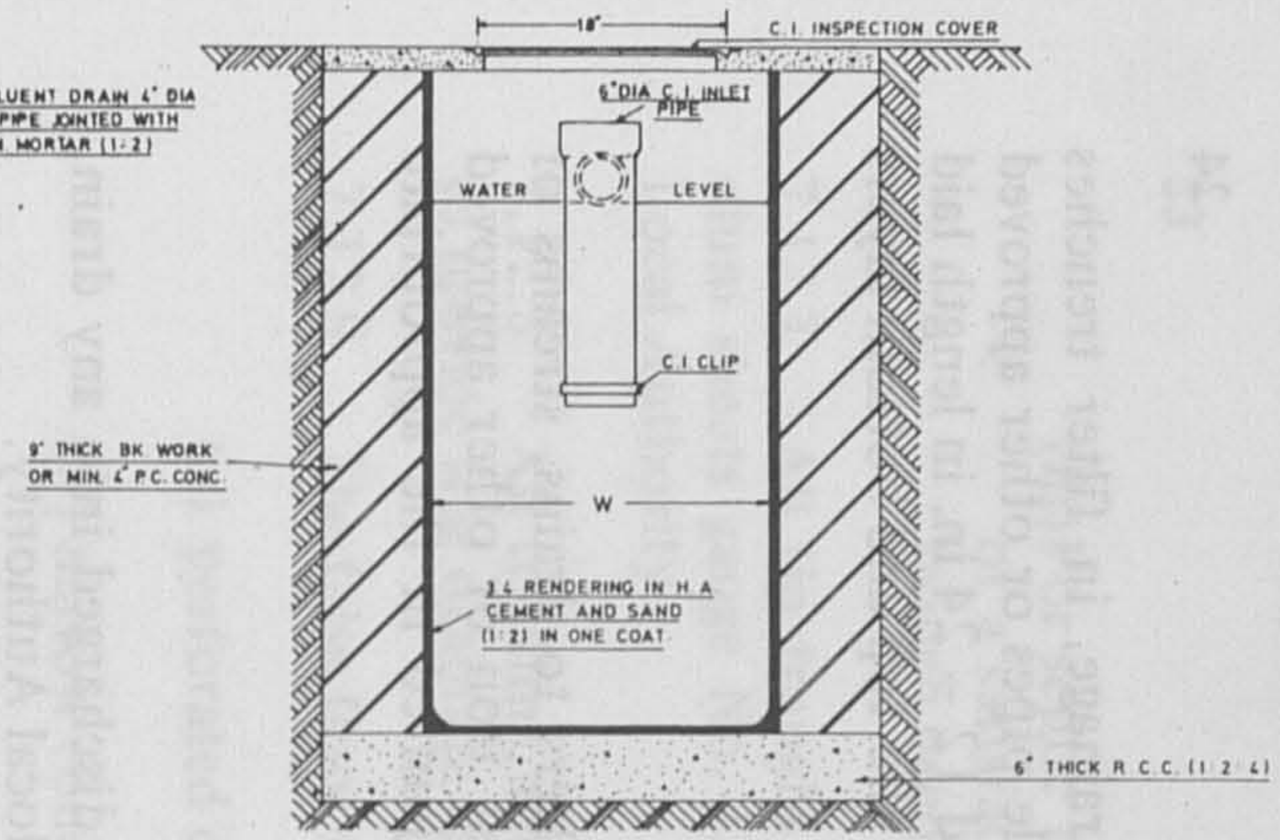
7.14 The pipes conveying effluent from filters to drains, streams or watercourse shall be of glazed earthernware cast iron or other approved material, laid to approved grades and falls and jointed in the appropriate method for the material.

Effluent standards

7.15 The standard of purity of the effluent discharged into any drain, stream or watercourse shall be determined by the local Authority.



LONGITUDINAL SECTION



SECTION A-B

SEPTIC TANKS

NO. OF PERSONS	CAPACITY IN GALS.	INSIDE DIMENSION			AIR SPACE	DEPTH BELOW W.L.	
		WIDTH	LENGTH	LIQUID DEPTH		INLET (MIN)	OUTLET (MIN)
8	400	2' – 6"	6' – 6"	4' – 0"	9"	12" TO 19"	15"
10	500	2' – 8"	7' – 6"	4' – 0"	9"	12" TO 19"	15"
12	600	2' – 10"	8' – 6"	4' – 0"	10"	12" TO 19"	15"
15	700	3' – 0"	8' – 6"	4' – 6"	11"	12" TO 21"	21"
18	800	3' – 0"	8' – 6"	5' – 0"	12"	12" TO 24"	24"
20	900	3' – 4"	8' – 6"	5' – 0"	12"	12" TO 24"	24"
25	1100	4' – 0"	8' – 6"	5' – 0"	12"	12" TO 24"	24"
30	1300	4' – 0"	10' – 6"	5' – 0"	12"	12" TO 24"	24"

NOTE:-

IT IS PREFERRED THAT SEPTIC TANKS WITH CAPACITY OF 600 GALS. AND OVER BE OF THE TWO COMPARTMENT TYPE IN WHICH THE FIRST COMPARTMENT SHOULD BE ABOUT TWO-THIRDS OF THE TOTAL CAPACITY OF THE SEPTIC TANK.

INLET DRAIN 4" DIA. G.W. PIPES

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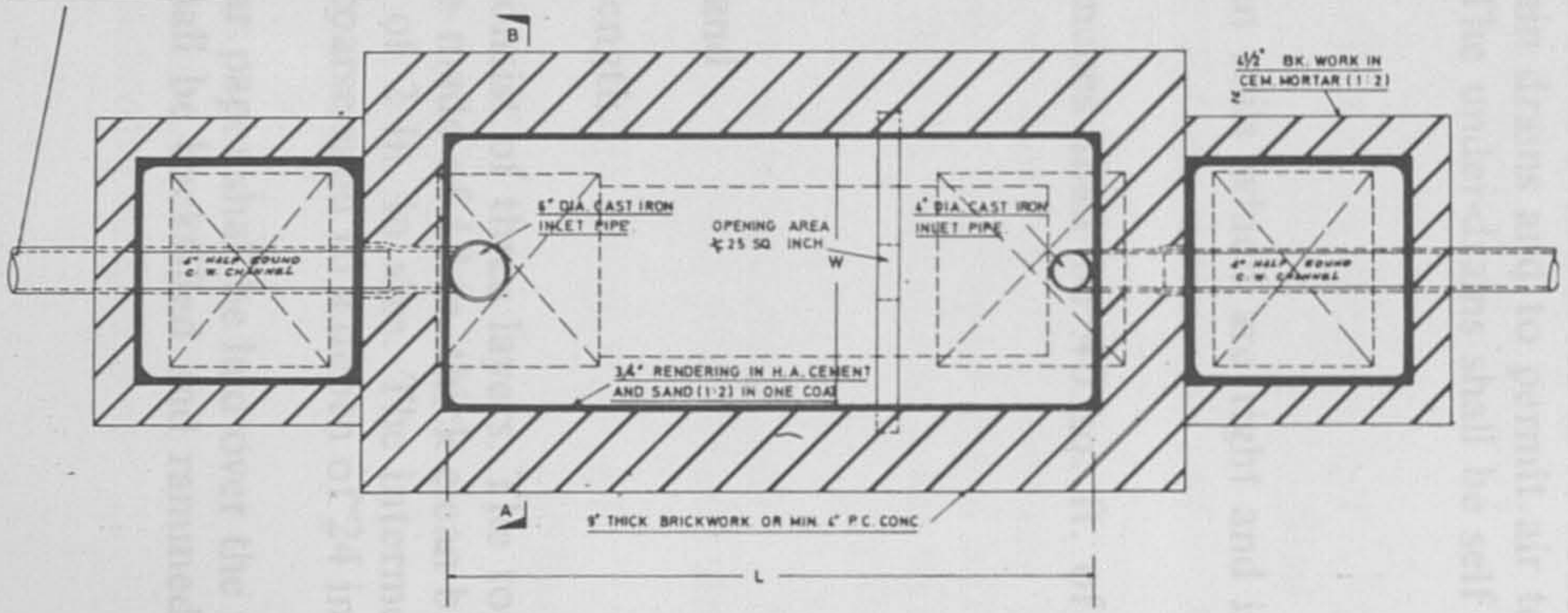

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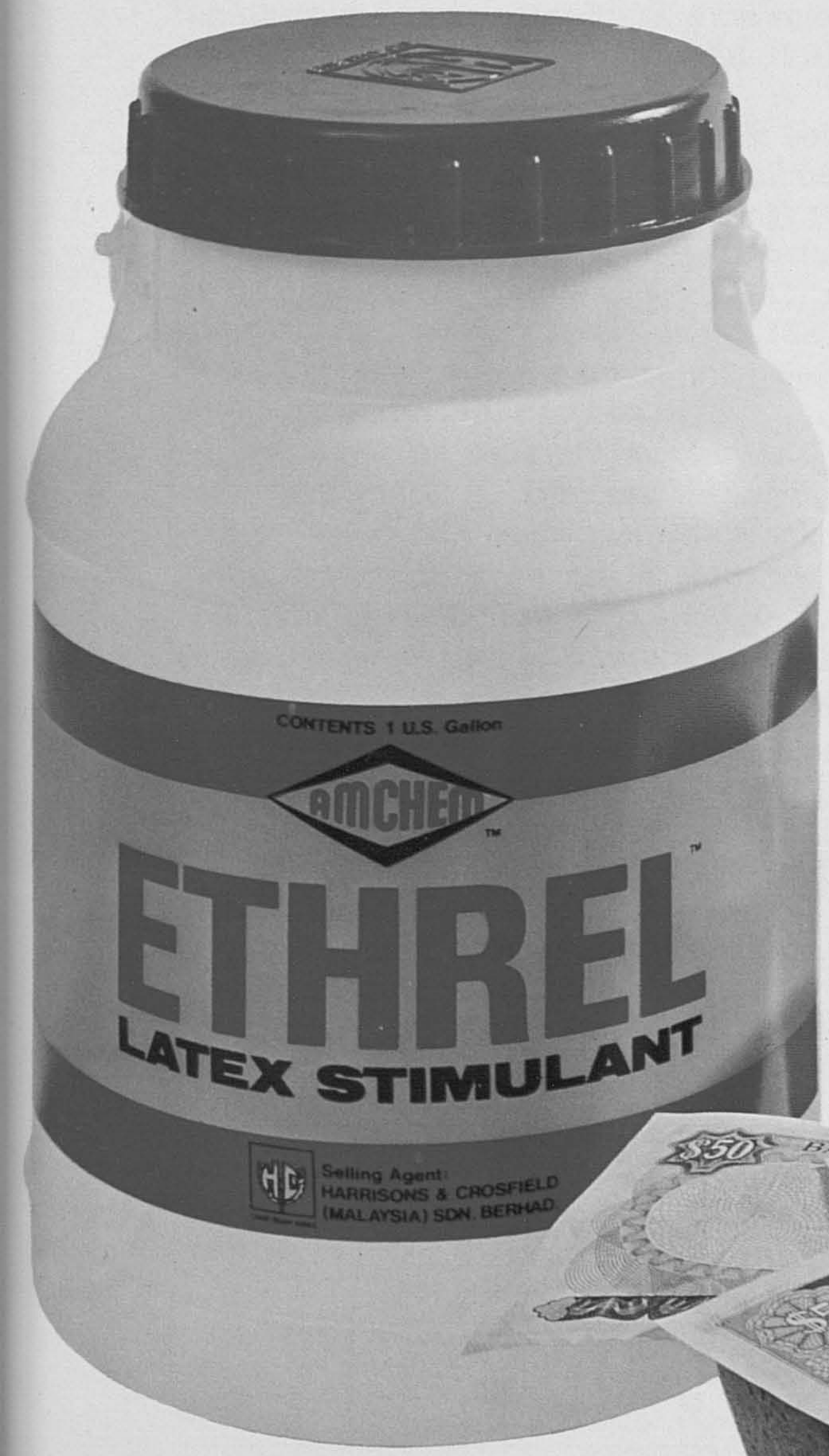

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An oil palm fruit bunch contains several hundred fruits which do not all ripen simultaneously. As the individual fruit ripens, it becomes easily detachable from the bunch. The period between the first fruit detachment and the time at which all fruit of a bunch are detached is normally 18–21 days.

The free fatty acids content (f.f.a.) of palm oil increases as the ratio of detached fruit to total fruit on the bunch increases, as does the oil yield (Dufrane and Berger, 1957; Ng and Southworth, 1973).

The aim in harvesting is therefore to obtain bunches which will give good quality oil without undue loss in yield.

After harvesting, bunches and detached fruits are transported to the palm oil mill for extraction, by one of the following means.

(a) Bunches and detached fruit are loaded directly into steriliser cages at the plantation itself, and transported to the factory by the plantations' own railway system. This method ensures minimum bruising of fruits.

(b) Bunches and detached fruit are carried to the road side, where they are either loaded on to lorries manually, or placed in nets which are mechanically loaded on to the vehicles. At the mill, the bunches are fed into hoppers prior to loading into steriliser cages.

Extraction of Palm Oil:- The extraction process for palm oil, as outlined in *Figure 1*, comprises several stages:

1. Sterilisation.
2. Stripping;
3. Digestion;
4. Pressing;
5. Oil clarification; and
6. Kernel production (from nuts).

Each of these stages is described below in turn.

STERILISATION –Sterilisation of f.f.b: has two prime objectives: to inactivate the enzymes responsible for breakdown of oil into free fatty acid (f.f.a.) and to loosen fruit from bunches.

Sterilisation of bunches is carried out in horizontal, tubular vessels, in which the bunches are subjected to steam heat treatment. Sterilisation usually lasts for about 70 minutes, at a steam pressure of about 3.0 kg/cm^2, during which great care is taken to expel all the air from the steriliser at the beginning of each cycle.

STRIPPING – In the stripping stage, fruits are separated from the sterilised bunches, which are fed into a rotating drum with longitudinal channel bars so positioned to allow fruits to fall through. Empty bunches are passed to the end of the drum, from where they are conveyed to the incinerator for disposal by burning. The ash is rich in potassium, and is used as fertiliser.

DIGESTION – After stripping, fruits are conveyed to a digester in which they are converted by stirring into a homogenised mass suitable for extraction of the oil. In this operation, the oil cells are ruptured so that oil can flow from the fruit easily when pressure is applied.

PRESSING – After digestion, the fruit mass passes into a screw press where pressure is applied by means of a worm screw. The oil flows from the fruit through a perforated cage surrounding the screw. The deoiled fibre-and-nut mixture is continuously expelled through a cone at the end of the press.

OIL CLARIFICATION – The liquor expelled from the press contains oil, water and solids. The first stage of the clarification process is a static settling in tanks.

The layer of oil at the top in these tanks is continuously decanted, and passed through a centrifugal purifier and a vacuum drier to remove solids and moisture. The clarified oil is pumped into storage tanks for shipment.

PRODUCTION OF KERNELS FROM NUTS – The fibre-and-nut mixture is separated in an air column. The separated fibre is used as fuel in the boilers. The nuts, after drying, are cracked in centrifugal crackers. Air and water separation systems are used to separate kernels from shells. The kernels are dried prior to packing.

Control of Oil Quality during Extraction –Malaysian producers are well aware of the need to produce a consistently good quality palm oil, and have hence introduced continual improvements in the methods of extraction.

Typical examples of such innovations are given below:-

* Utmost care is taken during harvesting and transport of f.f.b. to prevent bruising of fruit which would result in a build-up of f.f.a. Care is also taken to exclude debris from being transported with f.f.b. to the mill, to minimise erosion of machinery which could result in increase in the iron content of oil.

* During sterilisation, great care is taken to expel all the air from the steriliser, so as to prevent oxidation of the oil, and to ensure that the optimum sterilising temperature is reached.

---

*See Malaysian Palm Oil Producers Association, 1974

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5. Spare parts and small tools.
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* Temperatures are strictly controlled throughout the process, to prevent oxidation of oil.

* Wherever possible, the oil is protected from contact with air to prevent oxidation. For example, oil purifying centrifuges are hermetically sealed.

* Copper and its alloys are totally excluded from all components in the mill machinery in contact with the oil. Use of stainless steel pipes for oil lines is gaining popularity.

*Table 1. Quality characteristics of Malaysian palm oil at time of shipment**

Property	Standard Quality		Special Quality	
	Typical value	Range	Typical value	Range
F.F.A. (%)	3	± 1	1.8	± 0.2
P.V. (m. equiv./kg)	4.5	± 2	3	± 1
100 (a_{235} + a_{270})	15	± 3	10	± 2
Heat bleach †	0.7	± 0.3	0.5	± 0.3
Mixed bleach ‡	1.2	± 0.6	1.1	± 0.2
Moisture (%)	0.1	± 0.03	0.1	± 0.03
Impurities (%)	< 0.01	–	<0.01	–
Iron (p.p.m.)	3.5	± 1	3.5	± 1
Copper (p.p.m.)	< 0.2	–	<0.2	–

* See MALAYSIAN PALM OIL PRODUCERS ASSOCIATION, 1974.

† Residual colour in Lovibond red units, measured in a 1-inch cell after bleaching under CO_2 at 300°C for 30 minutes.

‡ Residual colour in Lovibond red units measured in a 5¼-inch cell after a heat bleach under CO_2 at 240°C for 1 hour followed by a 20-minute bleach at 110°C with 1% tonsil earth. In general, it is found that 'Special Quality' oils give consistently better colours with most bleaching methods.

Palm oil quality is continuously monitored at all stages of extraction as part of the industry's quality control operations. Current quality characteristics of Malaysian palm oil at time of shipment are as in *Table 1*.

Storage and Shipment of Palm Oil – Although the high tocopherol content of palm oil (about 800 p.p.m.) gives the oil a natural resistance to oxidation, Malaysian palm oil producers nevertheless make every effort to prevent any undue quality deterioration during storage and shipment.

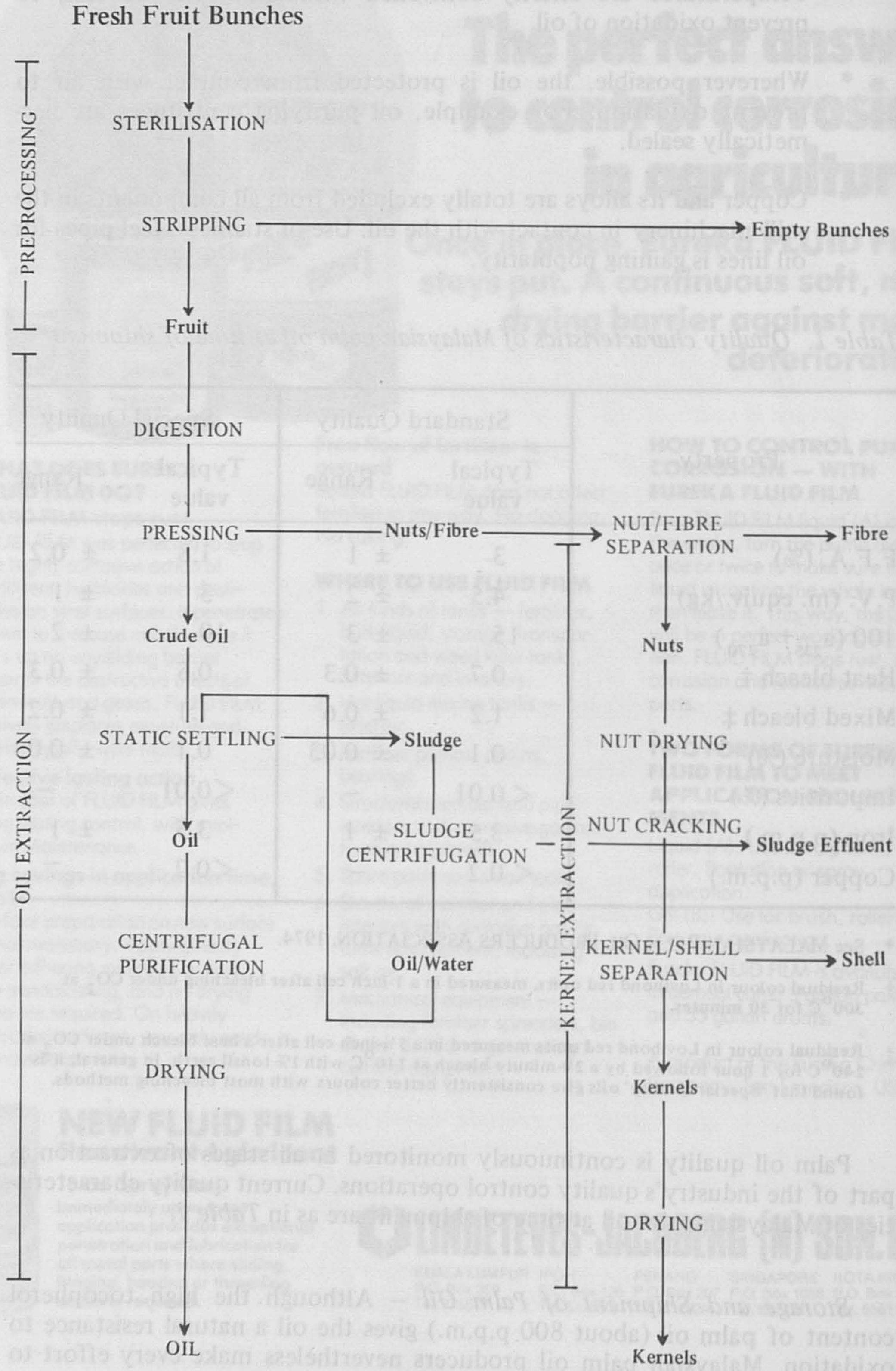

Figure 1. Flow diagram of the extraction process of Malaysian palm oil.

A BREAK THROUGH IN THE BATTLE OF INSECT AND NEMATODE CONTROL

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The storage temperature of the oil at Malaysian bulking installations is strictly controlled, to ensure that the maximum temperature of the oil does not exceed 55°C. Some bulking installations also use epoxy coated tanks to reduce iron contamination. Sparging and blanketing of the oil in storage with inert gas is gaining ground in Malaysian palm oil industry.

These measures have helped to preserve the quality of Malaysian palm oil in respect of oxidative stability and bleachability so that it is now used extensively in margarine production (Johansson and Phelergard, 1976).

In general, palm oil is shipped in parcel tankers, equipped with coated tanks and efficient heating control systems to protect oil quality during voyage. Strict guidelines cover the conditions of shipment of the oil.

END-USES FOR PALM OIL

Palm oil is a 'general purpose' oil. The food manufacturers use the oil in many of their formulations due to its physical and chemical properties (Berger, 1976).

Malaysian palm oil, because of its high quality, can be easily refined into a bland, neutral, light-coloured product. This is due to the low oxidation value and excellent bleachability of the oil, notwithstanding its high carotene content (Jacobsberg, 1974). A recent survey of Malaysian palm oil has also confirmed this (Krishnan, 1975). Because of its non-foaming characteristics and natural stability, it is used increasingly as a frying fat in Europe and the United States of America. Malaysian palm oil is also used extensively in margarine, shortening, and confectionery formulations (Berger, *loc. cit.)*

Modern fractionation techniques have opened further possibilities for increased use of Malaysian palm oil, *e.g.*, the right mixture of olein and stearin fractions in margarine formulations has obviated the need for hydrogenation. Fractionated palm oil from Malaysia is used in increasing proportions in shortenings as replacement for cholesterol-rich animal fats.

As Malaysian palm oil contains about 50% unsaturated fatty acids, it should not be regarded as saturated oil. The major unsaturated acid present being oleic acid, palm oil can be considered a neutral fat, in terms of its effect on blood cholesterol levels (Kinsell, 1963; Ahrens *et al.*, 1955).

The formation of oxy-polymers at high temperatures is common to all glycerides, but is particularly severe in oils containing large amounts of oxidation-prone poly-unsaturated fatty acids (Iterg, 1972).

Palm oil, containing only about 9% of linoleic acid, is less prone to the formation of oxy-polymers and is thus used widely in Europe and the USA for deep frying (Berger, *loc. cit.*).

The total sterol content of palm oil is about 0.03% (Swern, 1964; Loncin and Jacobsberg, 1963), the major sterols present being β-sitosterol (63% of total sterols), campesterol (21%) and stigmasterol (21%). Cholesterol constitutes approximately 4% of the total sterols present in palm oil, or only 0.001% of the oil. As this is further reduced during refining (Holz, 1928; Mattikow, 1948; Neal, 1944), the cholesterol content of refined palm oil is negligible.

RESEARCH AND DEVELOPMENT

Much of what is known about the oil palm, as well as the composition and characteristics of Malaysian palm oil today, may be attributed to the foresight of the growers in establishing independent research laboratories as far back as 1911. The initial experiments were largely concerned with breeding and selection of high yielding palms, and developing their resistance to pests and diseases.

The first palms planted in Malaysia were *Elaeis guineensis* of the Dura (D x D) type, and all early plantations used this material. Since late 1950's, however, most of the planting material used in Malaysia has been the Tenera (D x P) variety which gives greater yields. This is a hybrid obtained by crossing Dura type of *E. guineensis* with the Pisifera type.

Developments in processing technology to give higher extraction efficiencies and better oil quality have followed.

Research on harvesting standards, nutrition, artificial pollination, pest control and weeding has also helped to improve standards of upkeep in Malaysian oil palm plantations.

Recognising the increasing importance of palm oil to the Malaysian economy, the Government has established the Malaysian Agricultural Research and Development Institute (MARDI) to undertake intensified research and development efforts in regard to all aspects of oil palm cultivation as well as the processing of, and the end-uses for palm oil.

In addition to routine quality control laboratories located in palm oil mills, there are now central laboratories in Malaysia equipped with the latest equipment for carrying out sophisticated analyses on oil quality.

On the agricultural side, research emphasis continues on breeding hybrids that will give a palm oil with higher iodine value and lower carotene content. An oil with high iodine value will mean a greater degree of unsaturation, and also a more liquid oil. A lower carotene content will mean less processing problems for the refiner.

With increasing quantities of palm oil being produced, Malaysia is now stepping up her efforts to increase demand for the oil through development

of new end-uses. From its initial use as an axle grease in the railways, palm oil has indeed came a long way, to be used now in shortenings, margarine, cooking oil and vanaspati.

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Letters to the Editor

5, January, 1977.

Dear Sir,

To Pre or not to Pre

I wish to comment on the views expressed on the subject of conference pre-prints by your correspondent Pre Posterous (who, incidentally, I suspect to be a well known conference contributor with a strong aversion to meeting dead-lines).

The circulation of pre-prints is not common in other international conferences, but provided they are produced in plenty of time it does seem advantageous, in that it should allow more informed discussion of each paper. However, lengthy and informative abstracts would serve the same purpose. I agree with Pre Posterous that confusion can arise from having two different published versions of a paper, and clearly, expenditure incurred in producing late pre-prints which no one has time to read is wasted.

However, there appears to me to be one major advantage in having papers contributed beforehand, which outweighs any disadvantages. This is that papers can be reviewed, and those that are not of a high enough standard can be revised or rejected. The papers submitted to conferences such as those organised by the ISP are very variable in standard, and this is likely always to be true. If the standard of conference is to be as high as has been true in the past, screening of papers will always be necessary. Such screening can only really be done on the basis of the full text; an extended abstract is not sufficient.

It does not follow that, because papers are submitted beforehand, they must also be issued as pre-prints, and it may well be that the advantages of issuing pre-prints are not enough to justify the expense. However, I think that the proposal, by Pre Posterous, that full papers could be submitted as late as the time of the conference, would inevitably lead to a lowering of standards.

Yours sincerely,

Pre Sumptuous

5 January, 1977.

Dear Sir,

Oil Palm Epiphytes

The paper by Piggott and Piggott on the above subject (Planter, Kuala Lumpur 52: 354–362, 1976) was most interesting, and I agree with their conclusion that few ephiphytes have an adverse effect on yield, and removal is usually of aesthetic value only.

The authors mention that orchids rarely occur as epiphytes on oil palm. I have occasionally found *Dendrobium crumenatum* on the trunks of old palms, from which the leaf bases have long since fallen. However, I have never seen *D. crumenatum* on younger palms which still retain their leaf bases, even on palms adjacent to village or garden trees with a profuse growth of this orchid. Otherwise, of the epiphytic orchids, I have only found a single plant of *Cymbidium finlaysonianum,* and one of *Grammatophyllum speciosum,* on oil palm, in several years of looking.

Piggott and Piggott note that terrestrial plants can become epiphytic on oil palms, rooting in the litter which accumulates in the leaf axils. The only orchid which I have found more than once on younger palms is a terrestrial species, *Eulophia squalida.* Most epiphytic orchid species grow best with their roots and stem bases exposed and well aerated, and I think that the moist litter which accumulates in the leaf axils probably does not provide a sufficiently well aerated environment. A pity, for a few orchids might add to the aesthetic appeal of the leaf axil flora, and discourage needless expenditure on removal!

Yours sincerely,

(R.H.V. Corley)


BACTOSPEINE®
for better ecological control
● BACTOSPEINE will attack only the target Lepidoptera pests like bagworms & nettle caterpillar but not their natural enemies.
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● BACTOSPEINE will not give rise to insect resistance.
● BACTOSPEINE is safe to human being, pet and warm blooded animals.
● BACTOSPEINE is non-toxic to crops anywhere when applied at concentrations many times greater than recommended.
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Tel: 382816/7/8
Biochem Products Ltd.
Basel, Switzerland.

The monthly crop

Bounties from EPF. The Minister of Finance, Tan Sri Tengku Razaleigh Hamzah, announced on 24th December, 1976 that the EPF Board in Peninsular Malaysia which celebrates its 25th anniversary in 1976 has decided to declare a special rate of interest of 7% to all its contributors. This is welcome news to all EPF contributors.

Further 'the EPF Board has also decided to build an element of insurance into the EPF scheme whereby a contributor who dies before reaching the age of 55 will be paid an extra sum over and above the actual amount of his contribution. We may call it a substantial death benefit in addition to his EPF credits'. This insurance benefit and credits would go to the dependants of the deceased member and in order to ensure this it may be necessary to ensure that contributors do not make any nomination in future. The Minister concluded the announcement with 'Briefly, the insurance works on a graduated principle, decreasing as the years go by. A young contributor would obtain more benefit from it and the benefit would decrease until it reaches zero when the contributor reaches 55 years, that is when he can withdraw his credits in full'. To provide for this scheme the EPF ordinance would have to be amended and the Minister proposes to do this at the first Parliamentary Session this year.

No Loss of Bounce. In 1975, large quantities of natural rubber which had been trapped in the holds of two ships for eight years in the Suez Canal were salvaged, and tests were carried out at the MRPRA to see how well the rubber had survived this ordeal, of prolonged exposure to high ambient temperatures. From tests carried out by Mr. Hon Kok Kee, MRRDB's representative in Italy, it was found that the long "imprisonment" suffered by the 'Suez rubbers' had not caused any deterioration in quality. Similarly in vulcanizate properties" there is little evidence that the Suez rubbers are significantly inferior, either at optimum or at overcure, or as regarding ageing resistance".

(Facts from "Rubber Development" No. 2, 1976)

The *pelesit* (Evil Spirit). The *pelesit* is very well known in Kelantan and Kedah. It is acquired by a special process in Black Art from the corpse of an infant, the first-born child of first-born parents. The creature becomes the owner's servant and obeys her in all things; its chief use, however, is to inflict sickness and death upon persons who are disliked by its patron. The owner of a *pelesit* is always a woman, who plays with it and feeds it on her blood and is supposed to keep it in a bottle. She can be recognised by her failure to meet the eye, by her refusal to take a bit of pinang nut, still pinched in the scissors of the betel chewer's outfit, or by becoming momentarily deranged (latah) if a frog is popped under a coco-nut shell and put behind her back. The *pelesit* can be exorcised by the following formula:-

Vampire, well do I know thy origin
Begotten of the after-birth,

Engendered of the discharge of unproductive blood,
Kemang thy name!
Gazing skyward they vomit be blood,
Bending earthward they vomit be ordure,
In the name of Allah and in the name of His Apostle!
With the blessings of Allah and the Prophet!

(From "Malay Poisons and Charm cures" – by John D. Gimlette M.R.C.P., L.R.C.P.)

Published 1929

Ross Institute Publications. The Society has acquired a small quantity of each of the following publications of the Ross Institute of Tropical Hygiene:

		Price per copy
Bulletin	No. 1 – Insecticides	$2.90
	No. 2 – Antimalarial Drugs	4.30
	No. 3 – Tropical Ulcer	2.90
	No. 5 – Housefly and its control	2.90
	No. 6 – Schistosomiasis	2.90
	No. 7 – Malaria and its control	4.30
	No. 8 – Rural Sanitation in the Tropics	4.30
	No. 9 – The Inflammatory Diseases of the Bowel	2.90
	No.10 – Small Water Supplies	4.30
	No.11 – Anaemia in the Tropics	2.90
	No.12 – Protein Calorie Malnutrition in Children	2.90

Supply will be made on the first come first serve basis. Orders received after our stock is exhausted may have to wait for fresh supplies from overseas. The above price includes postage and packing, but not Bank Commission which should be added on outstation cheques.

Raw Cocoa Processing. This is a preliminary publication of the result of a study that was carried out by the Agricultural Research Centre, Tuaran, Sabah, Malaysia, in response to many complaints by cocoa buyers that Malaysian cocoa beans possess a very high acidity that imparts a harsh acid taste to the product as well as mask all other flavours. This is a complete study of cocoa processing, right from seeds to the export product. The results lead to the important conclusion that large box fermentations and hot air drying can be utilised without any detrimental effect to quality and that Malaysia can produce cocoa beans comparable in chocolate flavour to those produced in Africa. Though work on this study continues on the same lines, the result obtained so far was considered of crucial importance to warrant this preliminary publication. This "Technical Bulletin No. 2" of the Department of Agriculture, Sabah, Malaysia is priced at $4.00 per copy. For orders through I.S.P., please add $1.00 for postage and packing.

Hotel concession rates for ISP members

We give below a list of hotels offering discounts on room rates to ISP members presenting their current membership cards.

Several hotels have imposed the condition that these discounts will not operate if bookings are made through travel agencies. Credit cards are likewise not favoured.

KUALA LUMPUR

HOTEL	DISCOUNT	SERVICE CHARGE	GOVT. TAX
Equatorial	15%	10%	5%
Federal	20%	10%	5%
Hilton	20%	10%	5%
Holiday Inn	10%	10%	5%
Majestic	10%	Nil	5%
Malaya	10%	Nil	5%
Merlin	20%	10%	5%
Pacific	10%	10%	5%
The Regent	20%	10%	5%
Hotel Abad Century	20%	10%	5%

SINGAPORE

Cockpit	20%	10%	3%
Goodwood Park	10%	Nil	3%
Hilton	20%	10%	3%
Merlin	20%	10%	3%
Mirama	20%	10%	3%
New Hongkong	10% (lower-rated) 20% (higher-rated)	10%	3%
Phoenix	25%	Nil	3%

PENANG

Ambassador	20%	10%	5%
Central	10%	10%	5%
E & O	15%	10%	5%
Merlin	15%	10%	5%
Rasa Sayang	10%	10%	5%
United	10%	10%	5%

IPOH

Eastern	10%	10%	5%

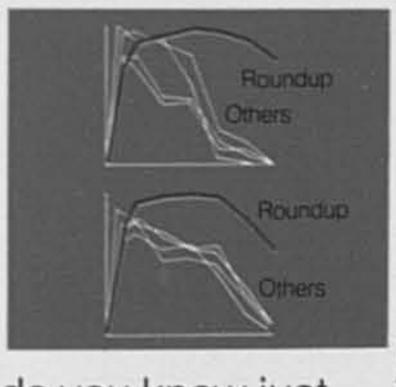
PAHANG

Merlin (C. Highlands)	20%	10%	5%
Merlin (Kuantan)	10%	10%	5%

Why should you buy the Rolls Royce of weedkillers?

Find out. Free.

When we go around plantations and ask, lots of times the answer we get back is "Well, I've heard that Roundup® herbicide might be quite good — but of course it's far to expensive for me ..."



But is it? And do you know just how good Roundup really is?

Do you know Roundup literally destroys lalang — leaves, rhizomes and roots?

Or that it controls Ottochloa nodosa and Paspalum conjugatum for over 6 months with a simple, one-shot low-concentration spray?

(Just look at the graph)

And that Roundup (in these days of sky-rocketing labour costs) can save you hundreds of manhours ...

Find out. Let us put on a demonstration for you. Free. On your place. At your convenience. All you spend is your time ...

It's our money.

Roundup®: real savings with effective weed control.

To:
The Agrochemicals Manager,
Shell Malaysia Ltd.,
P.O. Box 1027, Kuala Lumpur.

Please have your representative contact me to demonstrate—at no cost to me—the effectiveness of Roundup.

Name: .....

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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PULAU TIOMAN

*Merlin (*off season only)	20%	10%	5%

SABAH

Borneo (Kota Kinabalu)	15%	Nil	5%
Royal (Tawau)	10%	10%	5%

BRUNEI

Puspa Hotel	20%	–	–

SARAWAK

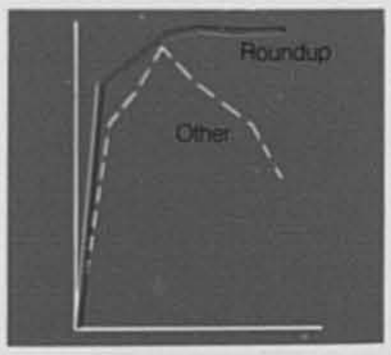
Fatimah Hotel	10%	–	–
Aurora Hotel	15%	–	–
Borneo Hotel	10%	–	–
Capitol Hotel	20%	–	–
Premier Hotel	20%	–	–
Sarawak Hotel	20%	–	–

Can Roundup® really kill lalang for over 12 months?

Find out. Free.

Seeing is believing.

And, while you've all perhaps seen a herbicide demonstration somewhere from time to time, there's nothing like seeing that demonstration carried out on your own plantation, against the product you're currently using.



Under the same conditions for shade, soil, sun, climate, rainfall and weed growth that would occur when you yourself were actually using Roundup® herbicide.

On your own property it's quick and convenient for you to check the results, month by m onth.

(We normally monitor results only for 6/9 months. You'll probably want to check for longer. Because Roundup usually lasts longer. Much longer, in many cases ...but this graph is typical).

So see your dealer for supplies, or fill in and send us the coupon.

We'll spend our money to prove to you just how good a weed-killer Roundup herbicide is. All it costs you is your time.

Roundup®: getting at the lalang problem.

To:
The Agrochemicals Manager,
Shell Malaysia Ltd.,
P.O. Box 1027, Kuala Lumpur.

Please have your representative contact me to demonstrate—at no cost to me—the effectiveness of Roundup.

Name: .....

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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2

"Sandy's Spice"

A.A. SANDOSHAM

Continuing my comments on my religious background, I must confess to have listened to quite a few sermons in my life. But then sermons help people in different ways; some rise from it greatly strengthened, others wake up greatly refreshened.

It seems one clergyman was holding forth from the pulpit when one of the congregation in a front pew got up ostentatiously and walked down the whole length of the aisle attracting the attention of the congregation and out through the door. This upset the padre very much and at the end of the service he sent for the wife to the vestry to give her a dressing down for her husband's unseemly behaviour. She replied, "I am sure my husband never meant to be discourteous to you, Reverend. It is simply that he has a tendency to walk in his sleep". I hope the preacher was consoled.

On another occasion, the visiting bishop was interrupted in the midst of his sermon by an insane member of the congregation with, "Do we have to listen to all this tommy rot?" This upset his lordship greatly, who turned to his vicar and asked, "Should I stop speaking now?" "No, no," answered the clergyman who knew this particular member of his congregation well, "You keep right on. It won't happen again. He is a mad chap who has only one sane moment every seven years".

DRY ROT

A visitor was duly impressed by the magnificent architecture and the wonderful state of preservation of the ancient cathedral. He turned to the verger who was his guide and asked, looking at the wonderfully conserved wooden panelling of the altars, "Is there any dry rot in this cathedral?". "No", he replied, "not anywhere except in the pulpit".

A priest preached for two full hours without feeling thirsty. "That is surprising", commented a member of the congregation, "considering it is the driest sermon I have heard this session".

A clergyman, having accepted an invitation to preach in a neighbouring town, got his vicar to take his place. On enquiring as to how he performed, his wife said it was the worst sermon she had heard and that there was no substance in it. The vicar himself was quite pleased with his performance. "I had no time to prepare, Reverend, so, I used one of your earlier sermons. It went down quite well really because I found fewer people than usual asleep during the sermon."

ADULTERY

One man approached his vicar complaining that one of the congregation had stolen his umbrella. The clergyman said sermons can be used for detection purposes. He would preach on the Ten Commandments the next Sunday and advised his parishoner to watch the faces of the congregation especially when he came to, "Thou shalt not steal". He did as he was advised but there was no look of guilt on anyone's face. When the preacher came to "Thou shalt not commit adultery", he suddenly remembered where he had left his umbrella and rushed out of the church.

At one time the fire and brimstone type of sermons used to be popular. The evangelist shouted, "There shall be weeping and wailing and gnashing of teeth". One old man interrupted with, "But I have no teeth". "Don't worry," assured the preacher, "teeth will be provided by the good God".

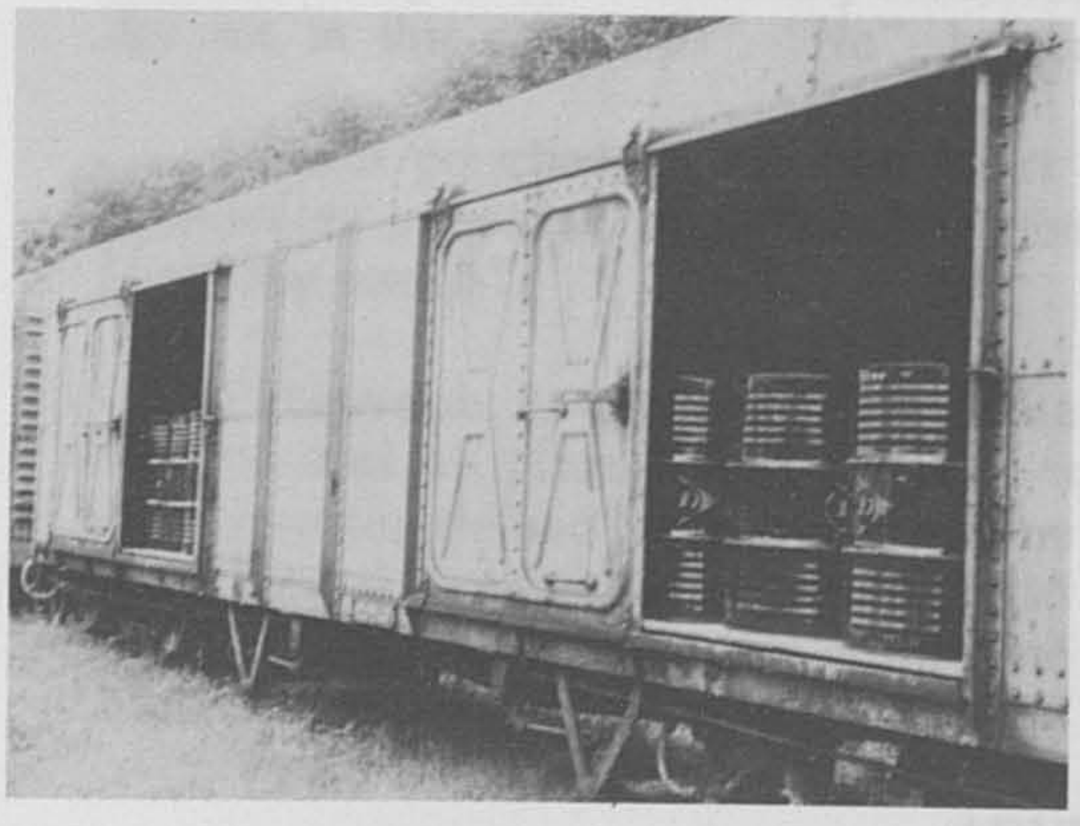
A congregation was happy when they learnt that their unpopular preacher was being transferred. He gave his farewell sermon and chose as his text, "I go to prepare a place for you". The congregation became curious and enquired where he was going. It turned out that he was going as chaplain to the State Prison.

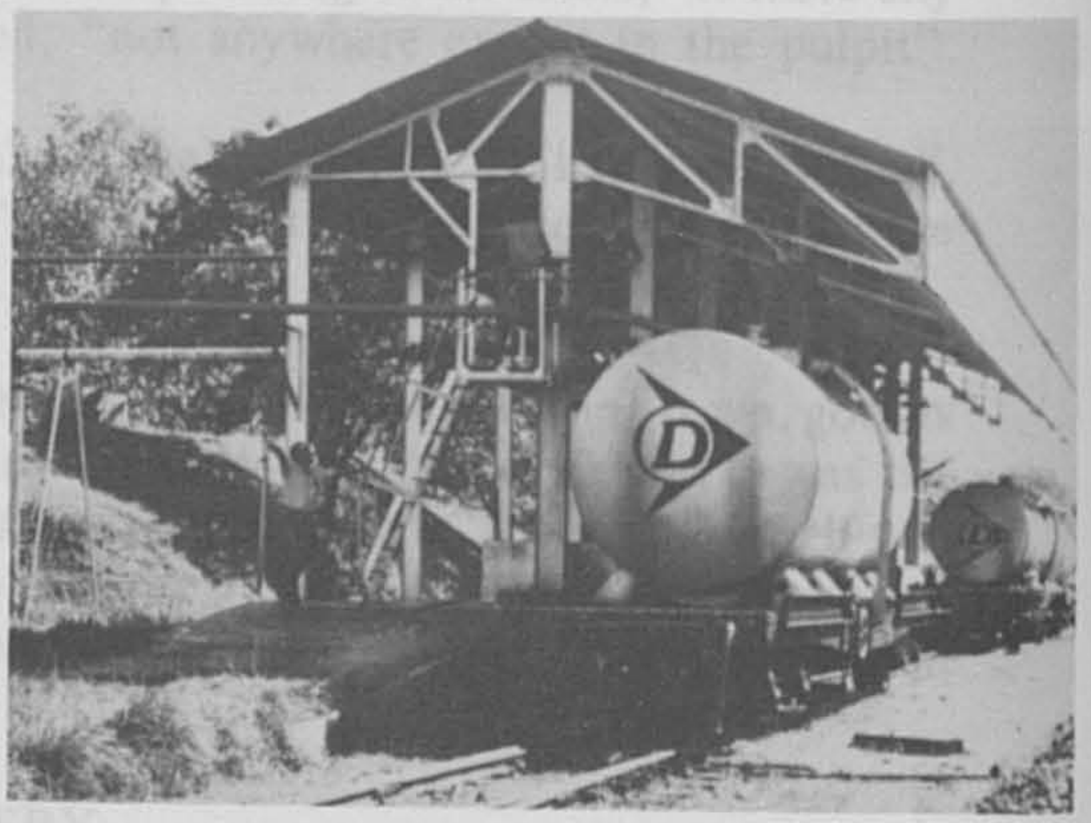
They say you can preach a better sermon with your life than with your lips. Not all priests accept that but prepare long sermons. One elderly Archbishop, whose memory was beginning to fail, used to go to the Cathedral during the week and dictate his sermon to his secretary who typed it all neatly and put the notes in the pocket of his surplice. On Sundays when he conducted the evensong he preached from his notes. On one occasion he found his secretary had not done her work properly. The theme was about Adam and Eve in the Garden of Eden. At the bottom of a page it said, "And Adam said to Eve". He turned over and found the wrong sheet. This had happened to him before and while searching for the correct page and to gain time he repeated with greater emphasis, "And Adam said to Eve". In the meanwhile he discovered that the correct sheet was not there at all. Forgetting he was in front of the mike, the shocked congregation heard him say, "Good Heavens, the leaf is missing".

KERETAPI TANAH MELAYU

RUBBER IN TRANSIT

Let it be in bales
Let it be in pallets
Let it be in drums
Or just let it flow into our tanks





In whatever form the rubber is, we will move it just the same.
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Pelabuhan Kelang	386272		

Social and Personal

Examination Successes

Estate Practice (Rubber)
22 September 1976

Shahabuddin b. Mohd Kamil	–	(West Pahang)
K.G. Menon	–	(Negri Sembilan)
K. Navaratnam	–	(North Johore)
Ho Kim Ang	–	(North West Malaysia)

Estate Practice (Oil Palm)
22 September 1976

Seng Kim Huat	–	(North West Malaysia)
Chear Mun Kee	–	(Central Johore)
Ahmad Tajuddin b. Mohd Mustafa	–	(North Johore)

Estate Practice (Coconuts)
22 September 1976

Lee King Wat	–	(North West Malaysia)

Elementary Bahasa Malaysia
13 October 1976

Tay Thian Teck	–	(S. Trengganu/East Pahang)
Tan Tai Leong	–	(North Johore)
Lau Kam Choon	–	(Selangor)
Chear Mun Kee	–	(Central Johore)
Chua Tek Wee	–	(North Johore)
Ho For Nam	–	(Selangor)
Seng Sei Kui	–	(Tawau)

Advanced Bahasa Malaysia
13 October 1976

Chua Kian Hong	–	(Selangor)
Guna Rajan	–	(West Pahang)
Norman Santa Maria	–	(Lower Perak)
Sin Chuan Eng	–	(Central Johore)

Elementary Tamil
22 November 1976

Wee Kow Ngoh	–	(S. Trengganu/East Pahang)

New members

6591 Gurmukh Singh, 161 Lorong Timur Zooview, Ulu Klang, Kuala Lumpur.

6592 J.H. Pratt, BAL Estates Sdn. Bhd., P.O. Box 135, Tawau, Sabah.

6593 Lian Suck Onn, Talisman Estate, P.O. Box 502, Kluang, Johore.

6594 Chin Hon Tin, Hap Seng Plantation Sdn. Bhd., P.O. Box 27, Tawau, Sabah.

6595 Gan Kiam Hong, Block 114, 1031N Depot Road, Singapore 4.

6596 Toh Ghee Heng, Kuantan Trading Oil Palm Estate, P.O. Box 11, Segamat, Johore.

6597 Wan Nik bin Wan Ismail, Lembaga Kemajuan Trengganu Tengah, Tingkat 1 Wisma Maju, Jalan Paya Bunga, Kuala Trengganu.

6598 Chan Thian Poh, Peninsula Plantations Sdn. Bhd., Simpang Rengam Pineapple Estate, P.O. Box 107, Rengam, Johore.

6599 Chiang Keng Leong, Dominion Estate, Semenyih, Selangor.

6600 K.K. Palaniappan s/o U. Vengadasalam, Lian Hup Rubber/Oil Palm Estate, P.O. Box 55, Kuantan, Pahang.

6601 Rajendran s/o K. Raman, Lian Hup Rubber/Oil Palm Estate, P.O. Box 55, Kuantan, Pahang.

6602 J.C. Tisera, Rejosari Estate, P.O. Box 51, Tanjungkarang, Lampung, Indonesia.

6603 Napitupulu ACP, Kedaton Estate, P.O. Box 70, Tanjungkarang, Indonesia.

6604 Soekardi K., Bergen Estate, Tanjungkarang, Indonesia.

6605 Abdul Karim, P.N. Perkebunan X, Jalan Raja Kedaton, Kotak Pos 74, Tanjungkarang, Indonesia.

6606 Acep Mahmud, P.N. Perkebunan X, P.O. Box 74, Kedaton, Tanjungkarang, Indonesia.

6607 Yin Thing Shin, 20 Jalan Bintang, Kampung Simee, Ipoh, Perak.

On leave

3809 McIntosh, W.D., PJK, Raintree, 20 Thorkel Road, Thurso, Caithness, Scotland.

5462 Mah, S.P. Dip. NRP, AISP, 167 Jalan Tunku Putra, Kulim, Kedah.

Returned from leave

5418 Cooper, I.W. Bukit Rajah Palm Oil Mill, P.O. Box 147, Klang, Selangor.

5727 Hoare, D.R. H & C Latex Sdn. Bhd., P.O. Box 205, Petaling, Selangor.

5780 Mayakrishnan, P, RRIM A.E.S. Division, P.O. Box 150, Kuala Lumpur.

4551 Richmond, K.A.B. c/o S.I.P.L., Box 350 GPO, Honiara, British Solomon Islands.

Change of address

5240 Abu Hassan bin Haji Mamat, Felda Wilayah Selatan, 68G Jalan Indera Putra, Peti Surat 724, Johor Bahru.

5976 Abdul Aziz b. Yusof, Rubber Advisory Service, Ministry of Agriculture (Technical Service), Monrovia, Liberia.

6404 Ayob b. Hj. Abd. Ghani, Rancangan RISDA Sg. Ambat, Batu 23, Jalan Kota Tinggi, Wakil Pos Jemaluang, Mersing, Johore.

5008 Baskett, J.P.C., AISP, Dusun Durian Estate, Banting, Selangor.

5264 Boey Pak Chuen, Craigielea Estate, Bukit Pasir, Muar, Johore.

3716 Chitumbalam, G.T, 10-D Jalan Delima, Island Glades, Penang.

5097 Chew Chang Gi, Dip. Agri. (Malaya) AISP, ICI Agriculture (M) Sdn. Bhd., P.O. Box 284, Kuala Lumpur.

6166 Chan Boon Hoi, Ulu Tiram Estate, P.O. Box 710, Johore Bahru.

4827 Dass, Niranjan, Paya Lang Estate, Batu Anam, Segamat, Johore.

4347 D'Cruz, C.M. Bute & Dominion Estates, Nilai, Negri Sembilan.

6165 Ding Toy Huah, Layang Estate, Layang Layang, Johore.

4358 Dzulkifli bin Bahaman, 'Sri Sialang', 121 Kampung Bahru, Tanjung Ipoh, Negri Sembilan.

6375 David, Michiel, Ladang Tebrau, Peti Surat (K.B.) 501, Majidee, Johore.

6352 Green, A.H. c/o Western Africa Projects Department, The World Bank, 1818H Street NW, Washington DC 20433, U.S.A.

5877 Hassan bin Haji Ahmad, Gula Padang Terap Bhd., Bangunan UKIR, Jalan Tunku Ibrahim, Alor Setar, Kedah.

5197 Helmi b. Syed Noh Shahabudin (Syed), Chembong Estate, Rembau, Negri Sembilan.

5334 Huskisson, L.A. Paya Kamunting Estate, Jitra, Kedah.

4506 Hartley, C.D.H. Nam Heng Estate, P.O. Box 502, Kota Tinggi, Johore.

5882 Hashim b. Syed Abdul Rahman (Syed), Rengam Estate, P.O. Box 104, Rengam, Johore.

5098 Ismail bin Mohamed, Bagan Datoh Estate, Bagan Datoh, Perak.

5706 Janardhanan, P.S. Felda Wilayah Jengka, Bandar Pusat Jengka, Pahang.

4772 Khor Ching Weng, Swee Palm Oil Mill, P.O. Box 1, Senai, Johore.

4817 Kit Thien Looi, Sungei Balung Scheme, SLDB, P.O. Box 359, Tawau, Sabah.

4307 Koshy, P.J. AISP, Bukit Asahan Estate, Asahan, Malacca.

5108 Koh Tian Soo, Paya Lang Estate, Batu Anam, Johore.

5017 Leong Heng Khoon, Batu Lintang Estate, Serdang, Kedah.

5266 Lian Kwen Min, AISP, North Labis Estate, Labis, Johore.

5475 Lim Men Jang, AISP, Air Putih Estate, P.O. Box 510, Kota Tinggi, Johore.

5899 Mohd. Kamal bin Abdul Salam, No. 10-B1, Jalan Cendrawasih, Larkin Jaya, Johore Bahru.

4383 MacLean, R.J, AISP, Paloh Estate, Paloh, Johore.

6418 Mohd Amin b. Husin, Claire I, Johore Labis Estate, Cha'ah, Johore.

6485 Ondiveeran, P, 3A Cator Avenue, Taiping, Perak.

6559 Phua Thong Geok, Bukit Kiara Estate, GPO Box 206, Kuala Lumpur.

3258 Price, J.G.M. c/o Mados-Citoh-Daiken Sdn. Bhd., Pasir Plangie, Johor Bahru, Johor.

5265 Soo Fook Ngun, AISP, Tebong Estate, Tebong Malacca.

5315 Tan Keng Hean, Pengerang Estate, Pengerang, Johore.

5333 Tan, Vincent, Kamuning Estate, Sungei Siput (N), Perak.

5351 Tey Chin Yu, Dip Agri., Labu Estate, Labu, Negri Sembilan.

6178 Tan Ten Chai, Joseph, Sabah Kimia Sdn. Bhd., Locked Bag Service No. 15, Tawau, Sabah.

6416 Umezie, Isaiah Elekwachi, Smallholder Oil Palm Project, No. 2 Wetheral Road, PMB 1112, Owerri-Imo, State, Nigeria.

5313 Yeoh Oon Tit, AISP, Pegoh Estate, Alor Gajah, Malacca.

5519 Yang See Chuan, AISP, Jabor Valley Estate, Kuantan, Pahang.

4789 Yap Thean Seng, Hock Eng Estate, Tasek Glugor, Province Wellesley.

Culinary Treasure

AYAM PONG TEH

Approximate cost : $5.00
Enough for 6 – 8 persons

1 medium chicken about 2 kats.
1 kati potatoes
10 small onions
5 pips garlic
2 tablespoons tau cheo (min see)
¼ cup cooking oil
2 cups water
2 tablespoons thick black sauce
2 tablespoons sugar

METHOD

Grind separately onions, garlic and tau cheo into a paste.

Peel and cut potatoes into quarters.

Clean chicken and cut into pieces.

Heat up ¼ cup oil in an earthern pot. When hot, fry the garlic and onions and then fry the tau cheo until fragrant.

Put in the chicken pieces and fry for a few moments, stirring all the time to avoid burning.

Add in 2 cups water, 2 tablespoons sugar and salt to taste.

Put in the potatoes and cook until soft and gravy is thick.

A dash of Mono Sodium Glutamate will improve the flavour.

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Kuala Lumpur, Tel. 741444.

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