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MEMORIAL TUN ABDUL RAZAK
MALAYSIA

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

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The Planter

KDN 9432

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 2 000 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.

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Editorial:

BUDGET HUES

November 15 is a significant day to the people of Malaysia due to two events of great significance.

First, it marked the day on which *Dewan Rakyat*, Lower House of the Malaysian Parliament, approved in principle the 1977 Budget providing for $6,301 million operating expenses and $4,694 million for development expenses.

This is the biggest ever budget Malaysia has had so far ... it marked a new milestone in the 'career' of the Finance Minister, YBM Tengku Tan Sri Razaleigh Hamzah, whose popularity among every section of the Malaysian community and foreign entrepreneurs operating here has risen further as a result of his 'painless' taxation policy.

Although any budget is, in many ways, reflective of the collective responsibility of the Cabinet as a whole, special credit is due to the Finance Minister for breaking new ground with his innovative proposals for taxation as well as relief now approved.

The budget envisages a 10% growth rate in 1977 in respect of private investment which, during 1976 may reach only 3% growth, in 1975, it had a negative growth of 4%, according to the Tengku.

The budget, as anticipated, has provided for some relief from income tax for the low-income groups, to offset the cost-of-living burden. In the case of those who do not pay any income tax at all, the government hopes to provide 'other fiscal and socio-economic measures to improve their living standards'.

The relatively—and really—rich too would benefit in many ways from the 1977 Budget which provides adequate incentives for investment in Malaysia's industrial future.

Naturally, the Budget looks forward to Malaysia being able to raise part of her development finance requirements in foreign loans. But, as assured by the Finance Minister, the 'first call' will be on the country's own resources including its own reserves. In the first instance, some $368 million will be drawn in 1977 from Malaysia's external reserves (it was $101 million 'draw' from these reserves this year) ... future drawings will be in accordance with needs.

The first consideration of course is Malaysia's credit worthiness, for without this criterion, the credibility of the nation would be seriously jeopardised. As such, Malaysia is among the few third world countries which can boast of viability owing to their sizeable external reserves which serve as backing for the currency and as 'collateral' for the nation's foreign trade.

Thus, undue haste in scaling down external reserves would sap the vitality of any nation, especially in relation to the strength of its currency ... such scaling down has to be well-timed, balanced and resorted to in a manner that would not lead to problems as regards the parity value of the currency.

Congratulations are due to the Finance Minister in underscoring this aspect of budgeting ... as he rightly said, use of external reserves has, in the 1977 budget, been wisely combined with foreign loans and taxation to produce a welcome effect.

Perhaps, the umbrella of optimism which the Finance Minister unfurled resulted at least partly from the expectations of the country's fast-developing oil industry.

This formed the subject matter of the second event of significance we mentioned earlier—the Prime Minister's announcement that more than 50 companies had already offered to carry out oil exploration in the Malaysian off-shore areas.

The news was followed within 24 hours with the second announcement that Petronas has reached full accord with four oil companies on key economic and fiscal terms concerning production sharing arrangements.

Petroleum has the prospects of vieing with rubber as the nation's top earner of foreign exchange ... news that Sarawak's exports of crude petroleum provided a windfall of $1 billion during the first eight months of 1976 (almost double the earnings for the same period last year) is indeed reassuring, as the data that, during the first half of the year, petroleum exports netted $885 million, or 14.8% of the total exports of $5,997 million.

Rubber, however, remains the biggest export earner, accounting for 23.5% of the total export value. Its significance to the Malaysian economy—now and in the near future—has been duly recognised by the Finance Minister, by proposing to levy the export surcharge on the commodity only at prices higher than 62.5 cents per pound (hitherto 60.125 cents). With this proposal, he told Parliament, the *return* to producers would improve, particularly at the lower price levels.

In the case of palm oil, the export surcharge would become leviable only when the price is over $600 per ton (now it applies to prices of over $450 per ton).

In addition, the export duty itself will be reduced in order to ensure that the total duty and surcharge at prices below $900 per ton will be reduced, and only marginally increased when prices are above $900 per ton.

These changes will cost the government many millions of dollars in loss of revenue, but have been proposed to give the nation's agro-based industries a fighting chance to consolidate their lot and achieve further progress.

Agro-based industries will also enjoy the benefits granted to 20 types of industries which will be allowed accelerated depreciation allowances. These include canning of fruits and vegetables, manufacture of flour, flakes and chips from cereals, extraction and refining of coconut oil, manufacture of rubber products and production of pottery, china and earthenware.

The Budget has provided the private sector ample opportunities to "summon the old pioneering spirit and adapt realistically to the new challenges".

The Finance Minister has called for a more efficient private sector to ensure greater output, lower production costs and excellent product quality.

The Society endorses with pride the nation's objectives and remains assured that its members will respond to it magnificiently towards ensuring the continual growth of the 'cake' so that their own share of it will also grow commensurately.

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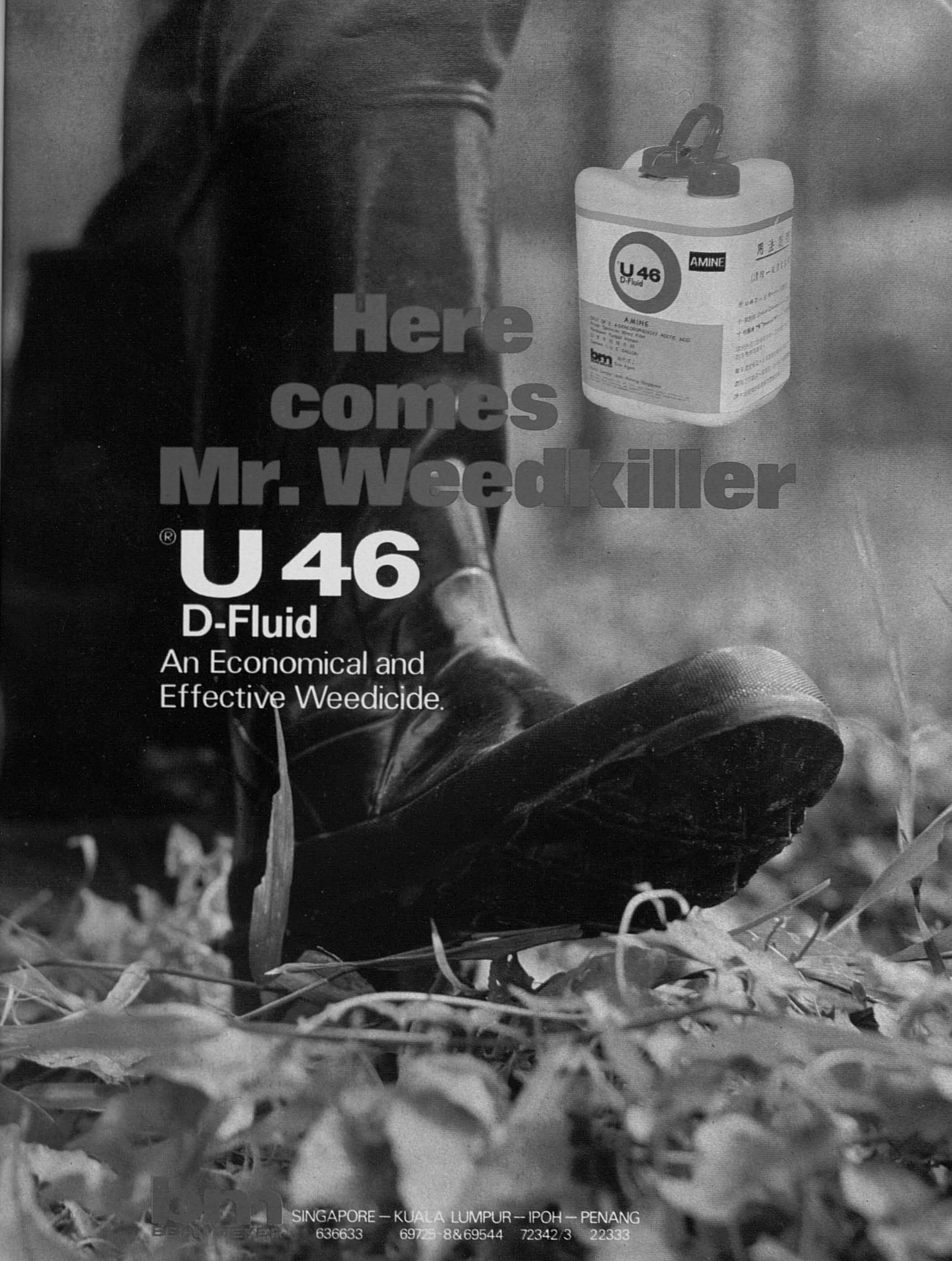
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Planter, Kuala Lumpur **52**: 420–423 (1976)

Extraction of sludge solids in palm oil effluents

J. THILLAIMUTHU*

SUMMARY

A new microbubble flotation process mechanically removes palm oil sludge solids, clarifies the effluent and simplifies biological treatment.

A new process has been developed using the microbubble flotation techniques based on experience in the pulp and paper industries, adapted for the small volume high densities of palm oil sludge. It provides a solution to the perennial problem of environmental pollution by making available the sludge solids for burning or economic utilization of the solids for animal fodder and fertilizer.

Any industrial or agricultural activity causes pollution unless positive measures are taken to prevent it. Therefore the present concern for damage caused to environment by palm oil and rubber industries is not over rated. However remote a plantation may be, in a country like ours which is blessed with a surfeit of rainfall the effluents will eventually find their way into streams, rivers and the sea. Yet, if it were not for the rainfall there would be no possibility of planting oil palms and rubber in the first place.

The aggravation of the effluent problem in the palm oil industry, is due to the establishment of larger and larger processing units for economic and commercial reasons. Palm oil effluents cannot be degraded biologically in a short time because of its peculiar character and constitution. It is a hot and almost sterile sludge containing extractives from the palm fruit with traces of oil for which no suitable quick acting aerobic or anerobic bacteria can be found.

It does not respond to ordinary treatment as in the case of municipal or domestic effluents because of the high density of suspended solids. Technically normal methods of filtration are impossible, and centrifugal separation is not all that effective because of the colloidal properties and is expensive.

Palm oil sludge comprises pulpy mass from the palm fruit interspersed with fine fibres, solubles such as sugars and residual palm oil. As mechanical separation of solids has not been thought possible it is regrettable that the practice of rating the sludge is only based on the total Biological Oxygen Demand (BOD). Simple laboratory separation by mere filtration in a Buchner funnel and assaying the filtered fluids would give a correct perspective of the real problem.

The BOD of palm oil sludge is given as 35,000 ppm, and if the solids are removed by the above method the fluids will be found to have a BOD of 500 ppm. The solids removed also removes entrained oil, for it will be seen that very little if any will pass through even the filter in the laboratory. The BOD of the solid and soluble fractions of the effluents are not proportional to their respective weights in a given sample. Bacterial action is slower on solids than on dissolved substances for obvious reasons.

* Industrial Patents (M) Sdn. Bhd., 111, Jalan Pudu, Kuala Lumpur.

Microbubble Flotation

The writer's familiarity with the problem of fibre recovery in the pulp and paper industry had indicated that this process may be of value to the palm oil industry. However in the paper industry volumes treated are high (upwards of 2 million gals/day) but fiber content is very low 0.002% to 0.05% equivalent max. BOD 2,000 ppm). Microbubble flotation depends on the solubility of air in water according to the well-known Henry's Law.

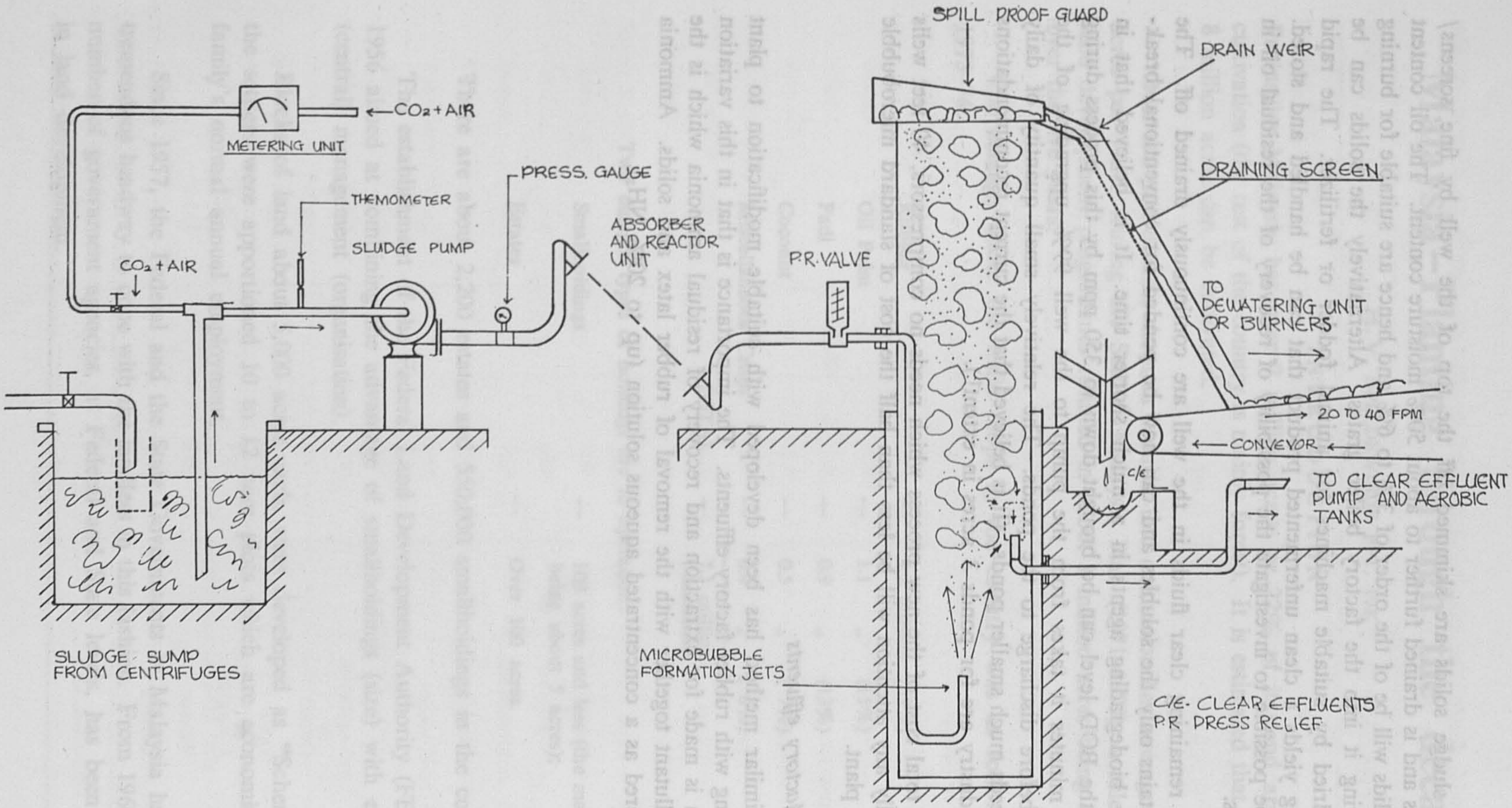
It was learned that some attempts had been made with the same process here but not with any significant success. The basic ideas of microbubble flotation and the economics in the pulp and paper industry does not apply to the palm oil industry. The systems attempted have been the use of fine bubbles of compressed air fed in at the bottom of a deep well. The head of water (in the standard processes in the pulp industry) in a well 40 deep causes air at the bubble tube end to go into solution and as the column rises to the top the dissolved air goes out of solution forming minute bubbles which enmesh with the fibrous and pulpy matter making flocs and raising them to the top. But because palm oil sludge is too viscous and because undissolved air bubbles from the tube, tend to break up and stir the flocs, the efficiency is reduced.

The new microbubble flotation process using air and $C0_2$

The method developed by us is improved on the standard process modified to suit the palm oil sludge and tailored to the special needs of the smaller scale operators where the volume to be handled is much smaller than in the pulp and paper industry.

Instead of depending on deep wells and hydrostatic air pressure in the well, a dynamic system is used with a mixture of air and carbon dioxide. This mixture is picked up from the chimney end of the factory boilers; only small quantities are needed about 10% to 15% of the volume of the sludge to be dealt with. The flue gas is cleaned by passing it through a column of water and is metered and aspirated into a special sludge pump where it is mixed with sludge (also cooled to 80°F) and pumped into a reaction tube. Carbon dioxide and air dissolve in the sludge during the passage through the reaction tube where a pressure of 90–100 psi is maintained. The pressurized and aerated mixture is then led into a well or tank 10 feet deep and released continuously by a relief valve. At this point the depressurized sludge will foam like a mug of beer. The minute bubbles then become enmeshed in the sludge forming floc which will rise to the top of the well where it is continuously skimmed off as a spongy scum.

To assist in floc formation the sludge may be adjusted for pH and treated with calcium hydroxide (lime), alum and polyelectrolytes used in water purification methods common today. Adjustment of air/$C0_2$ ratio give good control of the bubble size which is also related to other physical factors that are controlable.



NEW MICROBUBBLE EFFLUENT TREATMENT TANK FOR PALM OIL SLUDGE

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KUALA LUMPUR

The sludge solids are skimmed off the top of the well by fine screens/ conveyors and is drained further to about 50% moisture content. The oil content of the solids will be of the order of 3% to 6% and hence are suitable for burning by spraying it into the factory boiler grates. Alternatively the solids can be further dried by suitable machines for animal fodder or fertilizer. The rapid processing yields a clean unfermented product that can be handled and stored. It may be possible to investigate the possibility of recovery of the residual oil in the solids.

The remaining clear fluids in the well are continuously drained off. The fluid contains only the solubles and can now be ponded for conventional break-down by biodegrading agents in a much shorter time. It is believed that in practice the BOD level can be brought down to 350 ppm by this process during the few minutes it takes from the pump to the well 99% upgrading of the effluent before discharge to the ponds. The relatively small quantity of daily sludge needs much smaller ponds. (It is believed that the current recommendations in the industry are for ponds 3 acres in extent!).

The total cost of the new process which needs no compressors, 40 feet wells and hardly any attention will be less than half the cost of standard microbubble flotation plant.

Rubber factory effluents

A similar method has been developed with suitable modification to plant for dealing with rubber factory effluents. The importance is that in this variation provision is made for extraction and recovery of residual ammonia which is the main pollutant together with the removal of rubber latex and solids. Ammonia is recovered as a concentrated aqueous solution (up to 20% NH_3).

Malaysia – Planting through the decade

H. V. SPELDEWINDE PPT, PJK

INTRODUCTION

Peninsular Malaysia has over 7 million acres, or 22% of its land area, under cultivation (the rest of the country is mainly forest). It is estimated that a further 8 million acres can be cultivated.

Over the past decade, the area brought into cultivation has averaged 100,000 acres per year. During the Second Malaysia Plan (1971–1975), acceleration of land development programmes resulted in about 1 million acres being developed over the five years.

The acreage under the main crops in the country was as follows during 1973–74:

Rubber	—	4.2 million	(59%)
Oil Palm	—	1.1 „	(15%)
Padi	—	0.9 „	(13%)
Coconut	—	0.5 „	(7%)
Miscellaneous Crops	—	0.4 „	(6%)
TOTAL	—	7.1 million	

Two distinct types of holdings are in operation:

Smallholdings	—	100 acres and less (the majority being about 5 acres);
Estates	—	Over 100 acres.

There are about 2,200 estates and 550,000 smallholdings in the country.

The establishment of the Federal Land Development Authority (FELDA) in 1956 aimed at combining the advantage of smallholdings (size) with estate-type (central) management (organisation).

Blocks of land about 5,000 acres each, were developed as "Schemes" and the settlers were apportioned 10 to 12 acre plots which are economical for a family's normal annual employment.

Since 1957, the Federal and the State Governments in Malaysia have made tremendous headway to cope with the landless in this fashion. From 1960, a large number of government agencies, at Federal and State levels, has been involved in land development.

Table 1 shows the planted area and production details in respect of the various crops in Peninsular Malaysia during 1974.

Table 1. Peninsular Malaysia—Planted Area and Agricultural Production in 1974

Crop		*Area Planted*[1] *('000 acres)*	*Production ('000 long tons)*
Rubber —	Total	4,185.8	1,461.6
	Estates	1,456.5	673.3
	Smallholdings	2,729.3	788.3
Oil Palm —	Total	1,076.9	927.4
	Estates	679.0	n.a.
	Smallholdings	397.9	n.a.
Padi		939.6[2]	1,789.4
Coconut —	Total	537.7	118.1 (Copra)
	Estates	46.5	21.7
	Smallholdings	491.2	96.4
Miscellaneous Crops		427.9	—
Beverages —	Total	73.0	—
	Tea	8.3	3.1
	Cocoa	46.1	10.2*
	Coffee	18.6	6.2*
Food Crops	Total	114.8	—
	Sago	6.5	n.a.
	Sugarcane	40.6	n.a.
	Groundnut	12.7	n.a.
	Maize	5.1	n.a.
	Tapioca	28.5	n.a.
	Sweet Potatoes	5.2	n.a.
	Vegetables	13.2	226.5*
	Others	3.0	n.a.
Fruits —	Total	188.7	—
	Pineapple	53.9	276.6*
	Banana	38.9	173.6*
	Durian	21.7	87.2*
Total cultivated area		7,167.9	—

Table 1. Peninsular Malaysia—Planted Area and Agricultural Production in 1974 (Contd.)

Crop	*Area Planted ('000 acres)*	*Production ('000 long tons)*
Fruits (continued)		
Rambutan	25.4	136.3*
Mangosteen	3.9	7.4*
Watermelon	5.9	52.5*
Lime	1.2	n.a.
Pomelo	1.2	n.a.
Mandarin Orange	2.2	n.a.
Other Citrus	2.6	n.a.
Duku and Langsat	4.9	18.4*
Papaya	1.2	n.a.
Cashew Nut	13.7	n.a.
Mango	4.4	6.0*
Ciku	1.1	n.a.
Rambai	1.2	n.a.
Cempedak	3.5	21.0*
Jack Fruit	1.5	n.a.
Others	0.3	n.a.
Spices & Other Crops	51.4	—
Arecanut	6.1	n.a.
Chillies	2.3	n.a.
Ginger	1.2	n.a.
Pepper	2.5	1.3**
Tobacco	19.8	n.a.
Nipah	15.6	n.a.
Others	3.9	n.a.
Total cultivated area	7,167.9	

1 Area planted with rubber, oil palm and coconut refers to 1973 only.

2 Excludes off-season planting.

n.a. Not available.

* Estimates only.

** Based on export figures.

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	via Singapore			
KL 846(747B)	2015	Wed	0850	Thur
KL 844(747B)	2015	Fri	0845	Thur
KL 834(DC 10)	2125	Sat	0920	Sun
KL 836(DC 10)	2025	Sun	1035	Mon
Amsterdam to Kuala Lumpur				
KL 831(DC 10)	0940	Mon	1025	Tues
	via Singapore			
KL 845(747B)	1810	Mon	1905	Tues
KL 843(747B)	1815	Wed	1905	Thur
KL 833(DC 10)	1135	Fri	1410	Sat
KL 835(DC 10)	1255	Sat	1315	Sun

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ROUNDUP* NEWS 1976

Additional recommendations for new Roundup* uses.

*Trademark of Monsanto.

Monsanto's Product Development team explained that additional recommendations for Roundup now extends the uses of this unique herbicide.

Same product: Extended uses

Roundup's success in lalang control under rubber has been firmly established. Continuous research into applications now makes it possible to recommend Roundup for:-

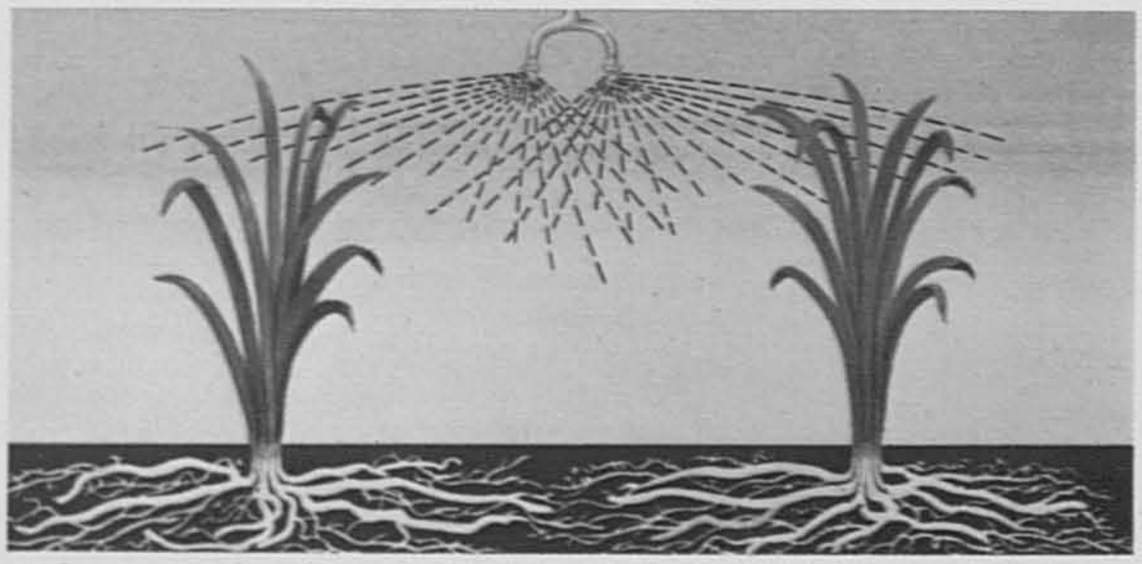
* Paspalum conjugatum and Ottochloa nodosa control in mature rubber.
* Lalang control in all stages of rubber.
* Lalang control in pre-plant areas for rubber and oil palm.
* Lalang control in non-fruiting (i.e. immature) oil palm.
* Lalang wiping.

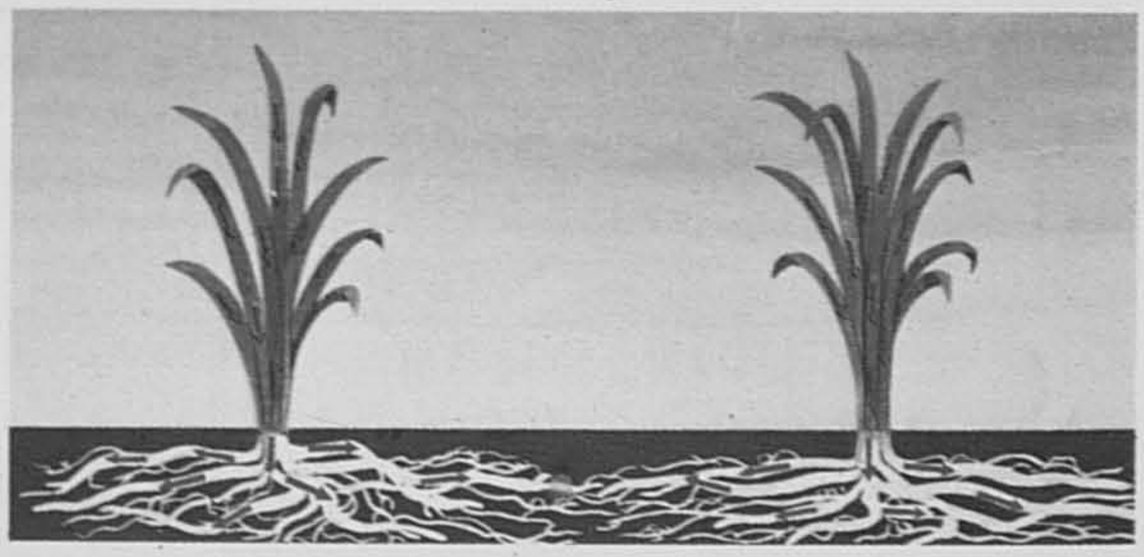
One-shot treatment

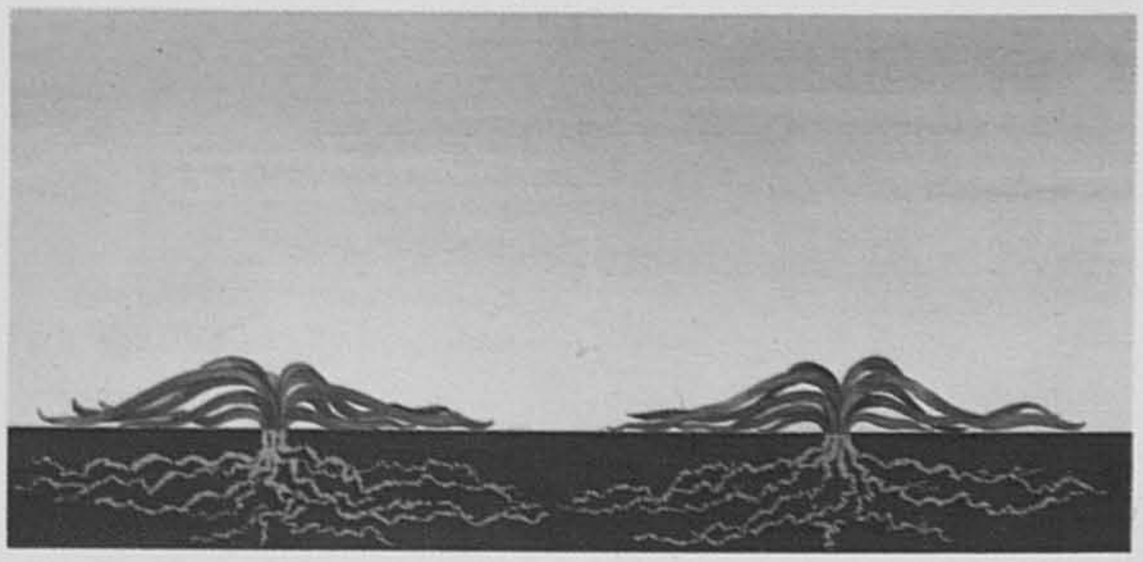
As planters have found, Roundup is effective with **a one-shot treatment.**

"Translocation" the basis of Roundup's effectiveness

Roundup works itself from the leaves into the root system **to destroy the entire weed** and not just the leaves. It is a **translocated weedicide.** The initial effects of Roundup may become evident later than in the case of contact weedicides which only burn the leaves. **But its ultimate result is superior and longer lasting.**







Roundup discovery : Shade is the key to weed growth and vigour

Monsanto found that shade is a determinant of weed growth and vigour. In open conditions, weeds are tougher and less susceptible towards weedicides than those weeds growing under shade. For optimum results, Monsanto's Product Development team therefore suggests dividing your weed problem areas into percentages of shades. This will enable planters to judge more accurately the appropriate dosage rate of Roundup to use.

The picture below show the four broad divisions of shade which field survey indicates that planters and their experienced field staff can easily differentiate and use as a practical guide.

1. Pre-plant areas (0% shade)

2. Very Young Rubber (0% — 30% shade)

3. Young rubber (30% — 60% shade)

4. Mature rubber (60% plus shade)

These extended uses are the result of continuous research and testing Monsanto conducts to establish additional applications of Roundup in all areas of weed control.

You can expect recommendations for further uses of Roundup from Monsanto in the years to come.

Continuous research for extended uses.

ROUNDUP.

POSTEMERGENCE HERBICIDE BY Monsanto

Spices Era (1800–1840)

Pepper gardens in Malaysia were propagated first during the 19th Century, on the foothills of Bukit Mertajam. Other spices grown included nutmegs, gambier, betel leaves and cloves. Their decline in importance was due to diseases, resulting in poor yields, and the emergence of sugar cane.

Sugarcane Era (1830–1900)

Sugarcane was cultivated in Province Wellesley long before Britain colonisation of Penang. Cultivation extended to Lower Perak in 1901. Sugarcane became an important crop in Province Wellesley because of the availability of good soil (alluvium), cheap water, transport and firewood (from the swamps) to boil the sugar, and low import duties on sugar imported into Britain from Province Wellesley. Species from West Indies, Java, Philippines and Mauritius were grown, but it was the indigenous variety which brought in more revenue.

Sugarcane later became a plantation crop and attracted the interest of Chinese and British Planters. Milling machinery was obtained by most of the plantations (one massive sugar grinding stone may still be seen in Gedong Estate in North Perak).

The period of expansion of the sugar industry saw the introduction of roads, which no doubt later provided the infra-structure for local development.

Early sugar pioneers had to face large numbers of prowling tigers on the outskirts of towns, and also formidable invasions of rhinoceros, snakes and wild hogs.

A French Planter, Leapold Chesseriau, was a pioneer in the introduction of tapioca together with sugarcane in the flat alluvial soils of Alma Estate (a mile south of Bukit Mertajam). Bulk of the tapioca was exported to Britain.

Early in the 20th Century, the industry expanded until it faced competition from European beet sugar, and the emergence of rubber. The last of the sugar factories closed down in 1913.

The sugar industry has come into the picture again, since 1960, when the Government invited teams from China and Australia to conduct a survey. The report of the survey was presented in 1965, and led to the establishment of three projects in Perlis, Perak and Johore (a fourth is under consideration in Negri Sembilan), to produce about 280,000 tons of sugar by 1976.

Rubber Era (1900 onwards)

Rubber is a native of Brazil, the seeds were brought into Britain by Henry Wickham and planted in Kew Gardens near London. Some 22 of these seedlings found their way to the Singapore Botanical Garden in 1877, and a few seedlings were later sent to Kuala Kangsar.

Cultivation of rubber in Malaya began in 1890. But large-scale planting started in 1910 when the coffee growers switched on to this new crop due to the falling price of coffee and the attack of pests.

In spite of the increased production, the price of rubber was then $4 a lb. The tapping system closely followed the Brazillian way of slashing the tree with a parang. As this was crude, Mr. Ridley, then Director of Singapore Botanical Gardens, found a better way of tapping, by re-opening the old cut with a small curved knife.

The success of pioneer rubber planting in Perak and Selangor was mainly due to the following:

* availability of surplus labour from sugar plantations (then declining),
* good network of roads already established;
* great encouragement given by the British Government; and
* high prices fetched by rubber in Europe and America as a result of the demand from the motor car industry.

It is interesting to note the price of rubber in 1900 was $1.70 per pound, and it rose to $5.50 per pound in 1906.

Rubber had its vicissitudes, experiencing a boom from 1909 to 1912, temporary set backs followed by reviving enthusiasm, falling prices and a gradual increase in the pace until 1941.

As viewed from the post-war scene, rubber occupies two-thirds of the total cultivated area in Peninsular Malaysia.

There has been a steady decline in the estate rubber acreage since the 1950's when rubber was planted in over 2 million acres (50% of the total planted area).

This decline is due partly to some of the rubber land being converted to oil palm a more profitable crop, and to the fragmentation of estates into smallholdings.

However, the decrease in estate rubber area has, to some extent, been compensated by a steady increase in the smallholding area, the total area under rubber thus remaining steady at 4.1 to 4.2 million acres.

While the total area under rubber has not changed significantly during the past 13 years, there has however been an increase in the total production by 6.1% per year. Total production increased from 734,600 tons in 1961 to more than 1.4 million tons in 1974.

SMR and Thereafter

The introduction of Standard Malaysian Rubber in 1965 resulted in Malaysia obtaining an unprecedented lead in respect of the production and marketing of technically specified NR. There are at present 85 modern factories equipped with plants for new process (SMR) facilities in Peninsular and East Malaysia. Many more factories are in the offing.

During 1974–1975, however, the output of rubber declined when the Malaysian Government introduced a national 'crash programme' to withhold supplies of rubber from world market, help restore NR prices.

Under this Programme, the estate sector was required to reduce its production by 87,000 tons per year by refraining from the use of ethephon and other chemical stimulants, reducing the frequency of tapping (by enforcing 14 no-tapping holidays in a year) and also a compulsory weekly day of rest for estate workers. Replanting estates which produced less than 1,800 pounds per acre was also accelerated under this Programme.

Apart from the estates, the remillers, packers and exporters were also requested to hold additional stocks of rubber over and above their stock positions as at the end of September.

These measures, together with the direct purchases of smallholder produce for the government's 'stockpile', reduced the availability of rubber in the market and had some desirable effect on prices.

Advent of Oil Palm

A native of West Africa, the oil palm was introduced into this country in 1875, and was originally grown as an ornamental tree in the Singapore Botanical Gardens.

H. Fauconnier introduced the dura seeds from Deli in Sumatra during 1911–1912 and planted it as a crop in 1917 in Tennamaram Estate, Batang Berjuntai, Selangor.

Guthries, Socfin and United Plantations were among the pioneer who followed up and established sizeable plantations. The Ulu Bernam Estate Factory in Lower Perak commenced production in 1926, and others soon followed. Johore eventually became the largest producer of palm oil, followed by Selangor and Perak, the production exceeding 1 million tons by 1974.

Since 1966, Malaysia has been the largest single exporter of palm oil in the world and is now responsible for at least 65% of the world output of the oil.

The bulk of trade is with Europe (more than 50%), United Kingdom, United States, Canada, Australia and West Asia.

It is estimated that, by 1980, Malaysia will have some 1.8 million acres under oil palm cultivation. The industry is organised largely on a plantation basis. Smallholders account for no more than 10% of the total acreage, through ownership of land under oil palm.

Government agencies like the Federal Land Development Authority (FELDA), Rubber Industry Smallholders Development Authority (RISDA) and various State Economic Development Corporations (SEDC) also partly account for smallholder participation.

Management of oil palm holdings is however on plantation basis with central processing facilities.

Table 2. Estimated Production of F.F.B. and Palm Oil in Malaysia, 1974–78.

Year		Oil Production ('000 tons)	Acreage ('000 acres) Mature	Immature	Total	No. of Mills	Production of F.F.B ('000 tons)
1974	PM*	930	676	446	1,122	70	4,650
	EM†		100	74	174	9	
	TOTAL	930	776	520	1,296	79	4,650
1975	PM	1,073	796	475	1,271		
	EM	143	120	78	198	90	
	TOTAL	1.216	916	553	1,469	90	6,090
1976	PM	1,268	935	415	1,350		
	EM	175	138	91	229	92	
	TOTAL	1,443	1,073	506	1,579	92	7,215
1977	PM	1,500	1,104	335	1,439		
	EM	204	163	87	250	101	
	TOTAL	1,704	1,267	422	1,689	101	8,520
1978	PM	1,664	1,230	287	1,517		
	EM	242	193	67	260	110	
	TOTAL	1,906	1,423	354	1,777	110	9,530

*PM—Peninsular Malaysia †EM—East Malaysia

FELDA, as the largest single producer of palm oil in Malaysia, has, since 1961, developed over 300,000 acres of oil palm.

In terms of oil palm planting material, the second half of the current century saw some dramatic changes. Until late 1950's, the duras (thick shelled fruits) were used for commercial plantings. Meanwhile, the hybrid nature of the teneras (thin shelled fruits) a cross between the duras and the pisiferas (shelless fruits, but tend to be highly female sterile)—was confirmed, and the industry switched to planting D×P's by mid 1960's.

During the transitionary period, however, some D×T were also used. With this change in planting materials, the oil extracted from the bunches (extraction rate) increased from 17% for the duras to 22% for the teneras.

Currently, much interest is being directed to the inter specific hybrid from the cross between the African oil palm (*Elaeis quineensis*) and the American oil palm (*Elaeis melanococca*). Its yield potential is yet to be confirmed, but the obvious advantages are its better quality oil (higher degree of unsaturation), low height increment and, probably, better resistance to diseases. Recent reports on the progress of tissue culture is most encouraging, but it would probably take another decade before the use of plantlets become commercially feasible.

Palm oil and kernel—Very extensive developments have taken place in the palm oil industry... production doubled from 424,000 tons in 1970 to 850,000 tons in 1973, closely following the targets set in the Second Malaysia Plan.

There are over 13 edible oil refineries in production today and the number is expected to increase to 20 by the end of 1976. Lever Brothers (pre-war) and Lam Soon (post-war) are among the pioneers of Malaysian edible oil industry.

From being a major exporter of crude palm oil, Malaysia is fast becoming an important centre for further processing of the oil.

Ultra-modern plants like those at Unitata have appeared on the scene. "From the palm to the table in 48 hours" is the philosophy of Unitata which is a fully integrated refinery (and joint venture between United Plantations Berhad of Teluk Anson and Tata Oil Mills of India).

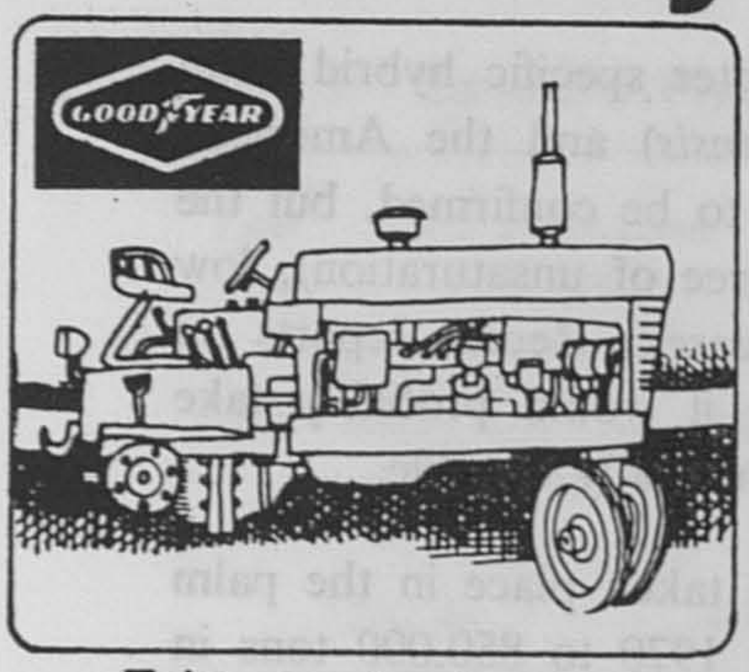
Unitata is the biggest organisation of its kind in Asia, and is unique in techniques regarding harvesting, extraction, fractionation and refining of palm oil (into a product of the finest SPB quality available) in a matter of hours.

To quote a spokesman of Unitata, "the fruits harvested in the morning in neighbouring Jendarata Estate are transported to the palm oil mill by noon. The crude palm oil from the mill reaches the Unitata refinery in the evening, to be immediately fractionated and refined ... it finally ends up as cooking oil, margarine or vegetable ghee at noon the following day."

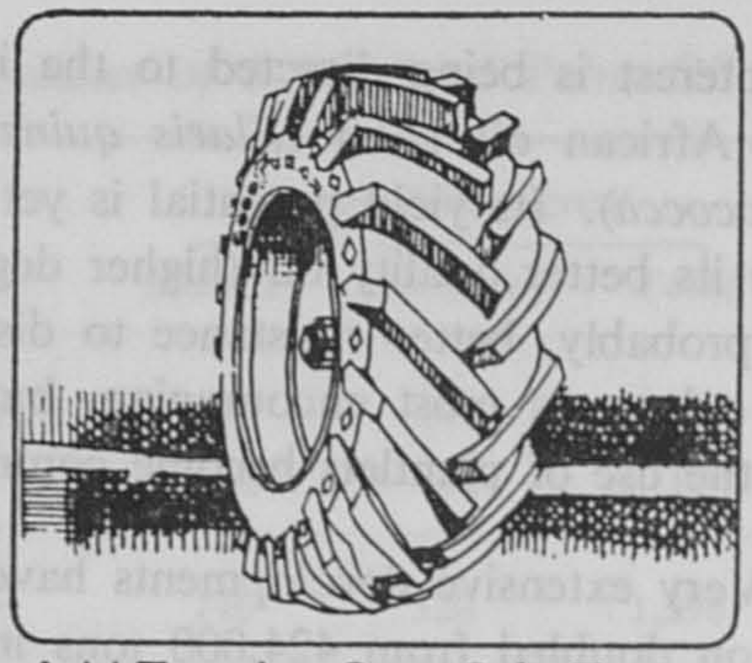
A comprehensive projection of the industry which includes FELDA schemes for the whole of Malaysia may be seen from *Table 2.*

(*Note*—The second and final part of this communication, to appear in the next month's issue of *The Planter,* will survey other crops of significance to Malaysia, including padi, coconut, cocoa, tea, coffee, soya bean and pineapple.—Editor).

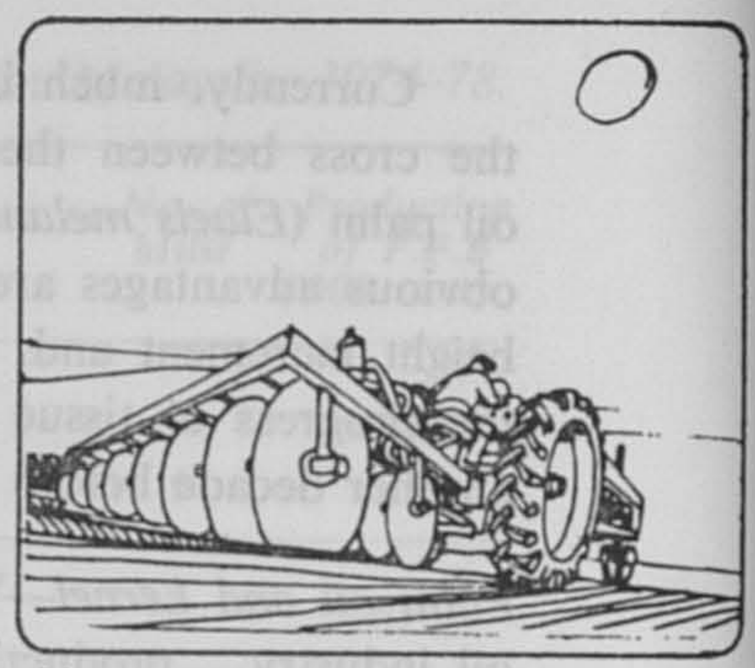
Goodyear leads the field.



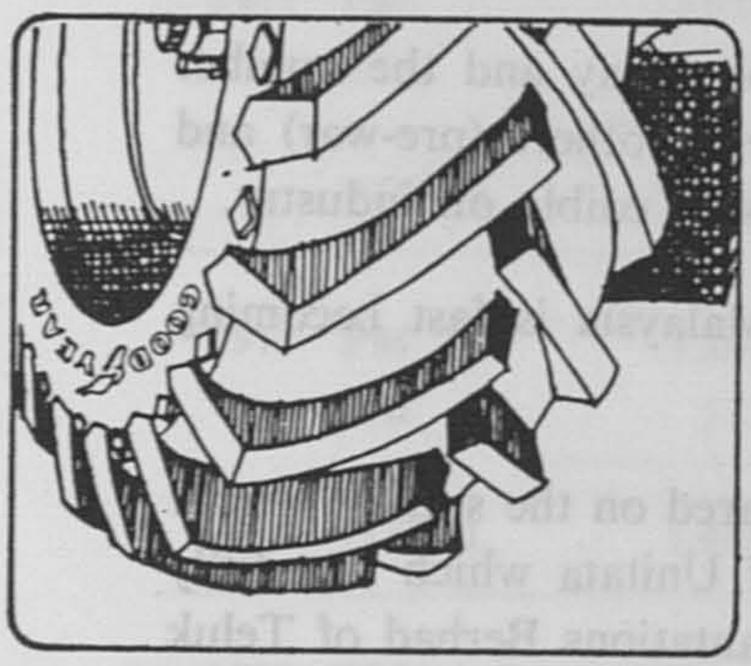
Take your tractor . . .



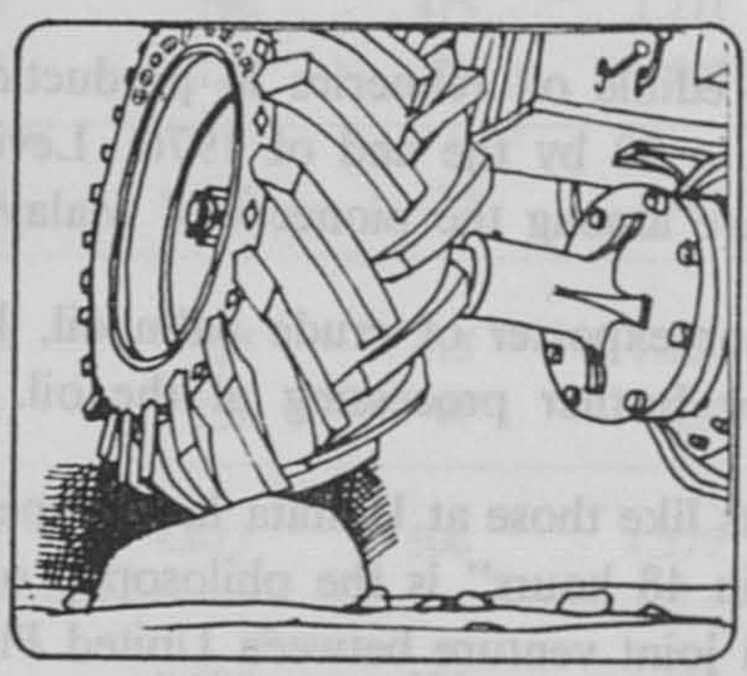
Add Traction Sure-Grip Tyres.



Now — get extra pulling power and save petrol.

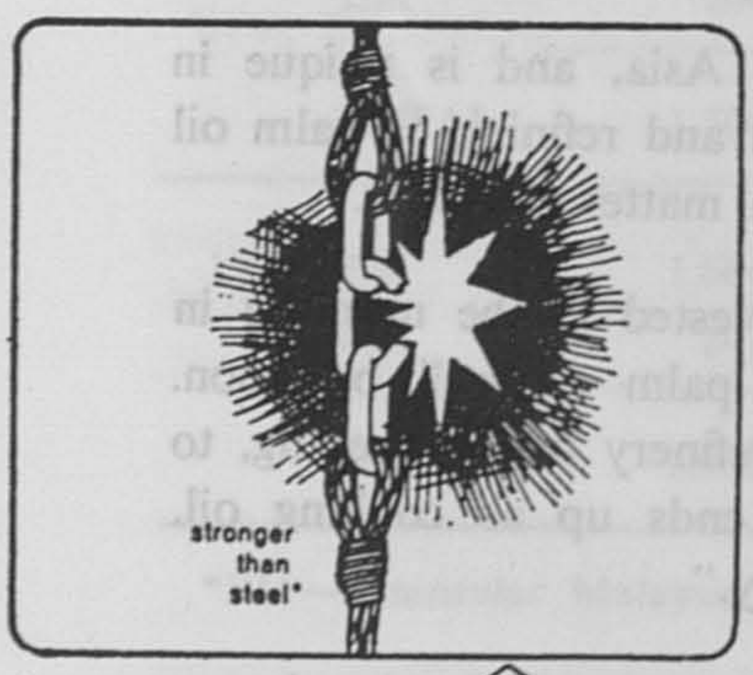


Reason: wedge-grip action.



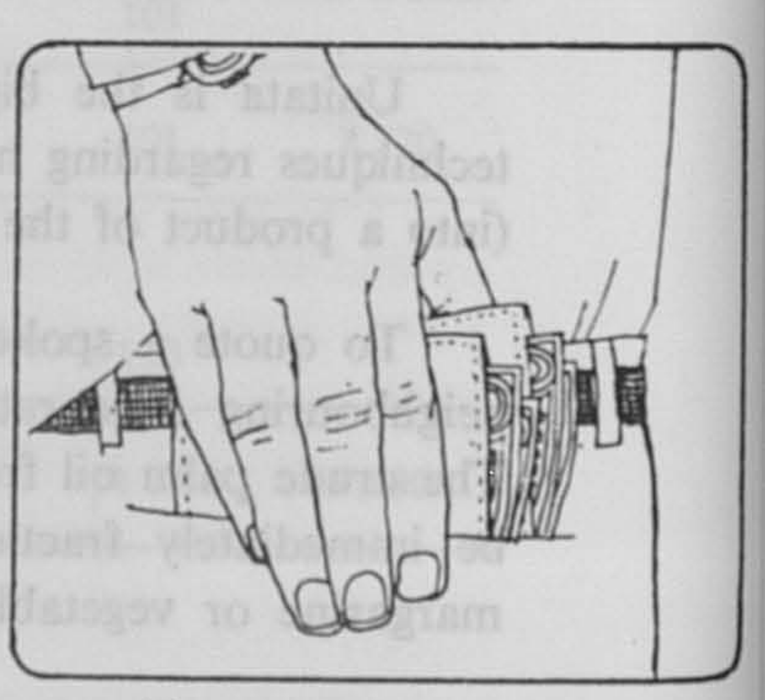
Forget field damage . . .

and excess road wear.



Why? Super tough 3T nylon cord body . . .

tough rubber compounds.



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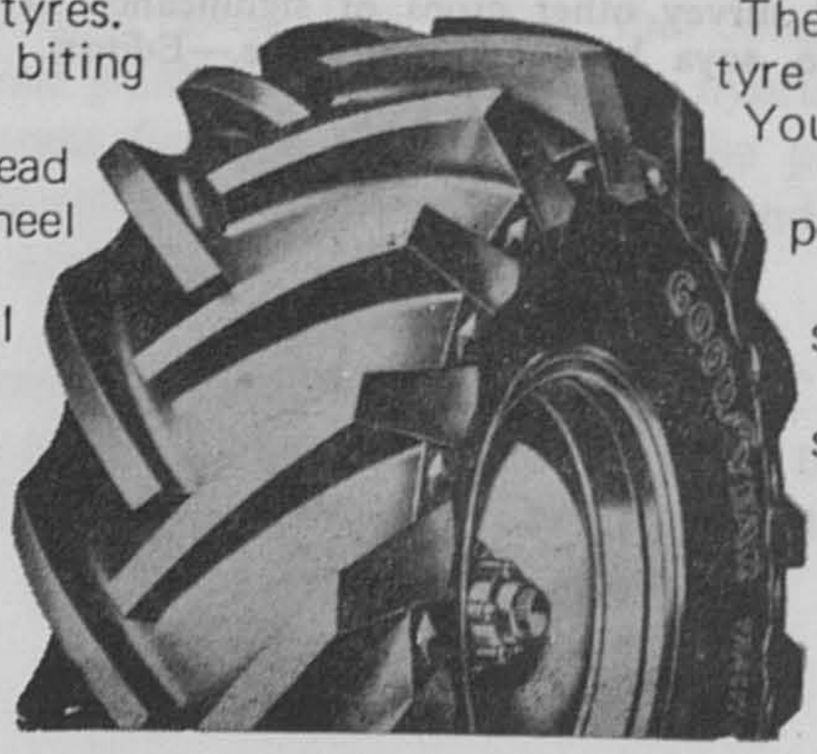

GOODYEAR

THE GREATEST NAME IN TYRES

Malaysian timber for estate use

Y. H. Lee and K. S. Ho

SUMMARY

This paper points out the economic and engineering advantages of timber as a material for structural construction and other common uses in the estate.

To do so it is necessary to identify the destructive agencies of wood and the nature and power of their respective destructive capacities, whereby the function and development of modern timber science and technology in prolonging timber's useful life can also be more fully appreciated. These agencies are (i) fungi, (ii) insects, which include boring beetles of various kinds, termites and carpenter bees, and (iii) fire.

Areas in which timber is widely used in the estate, such as trolley sleepers, fence posts, and building construction are discussed. General measures that should be taken to prevent or control the destructive agencies are described, and a short account of the results of research carried out by the Forest Research Institute on the proper preservatives and preservation treatments for wooden trolley sleepers and fence posts is given. The various aspects or steps that require consideration in the formulation of sound timber engineering practices and in the better utilization of timber properties in building construction in the estate are discussed.

INTRODUCTION

With the geographical position of Peninsular Malaysia in the tropical zone, and its climatic conditions which are marked with small changes in temperature throughout the year, the Malaysian forests contain luxuriant vegetation of the true rain-forest type, producing a great variety of timber species. To-date about 677 timber species capable of attaining a girth of 4 ft at breast height have been keyed and identified. A large variety and volume of wood, therefore, can be produced locally from the forest.

In Malaysia, one advantage of timber over other engineering materials is that it is an abundant local product derived from the forest which is a renewable natural resource. It is cheaper than steel, especially for sheds and other structural construction of medium span.

Nature has endowed timber with excellent qualities for a great variety of uses and advantages. Even in its raw, unmodified form it can be used to serve man's needs. In the modified or processed form its uses have no limits, and with modern technology there is no serious problem in cutting, shaping and recomposing wood. It is simple and easy to work on timber even with poor skill and light tools, compared to a concrete mixer and crane for steel girdles. Wood can be pre-cut and pre-fabricated; and with its relatively low density it can be transported in prefabricated forms with little difficulty. Simple fastening methods and ease of assembling, which enable shorter time of erection, add further advantages to timber as a building and engineering material. Being light, timber structures and buildings need no or little foundation.

TIMBER-DESTRUCTIVE OR DETERIORATING AGENCIES

The advantages of timber as a structural material are often not fully appreciated, mainly because prejudices have developed against it, grossly over-emphasizing that it is an impermanent material due to its natural susceptibility to attack by fungi and insect pests and fire risk; and that it is inferior to steel, bricks or concrete in durability, strength and as a status symbol.

The first prejudice can be quite easily removed by identifying the major destructive or deteriorating agencies of wood, and prolonging timber's useful life and improving its natural properties through technological advances that have been achieved; the second by using rational modern designs based on good, scientific wood construction theories and practices.

The major destructive agencies are

(i) fungi which cause decay (rot) and stain,

(ii) insects which include boring beetles of various kinds, termites and carpenter bees, and

(iii) fire.

Fungi

Fungi require all four of the following for their growth and development:

Food supplies—the cell wall substances of wood, and some cell contents form the food supplies of wood fungi.

Adequate moisture—above about 20% moisture content which is slightly above the equilibrium moisture content of timber in Peninsular Malaysia.

Suitable temperature—a fairly high, even temperature without marked changes.

Oxygen—exists adequately in the air which is in contact with the surface of the wood or which is inside the cells in the wood.

The infection and the spread of fungi is usually by means of minute spores (seeds) which are produced by fruiting bodies and which are blown by the wind like dust. If they settle on a piece of wood which is in favourable conditions as stated above, the hypae, the vegetative part of fungi, will grow by feeding on the cell walls of the wood or the cell contents, and gradually break up the cell structure until ultimately the wood disintegrates completely.

Insects

Generally, insects destroy or damage timber by tunnelling in the wood either for food or for shelter. They mainly belong to the following groups:

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NIAGARA

(1) *Ambrosia beetles*

These attack only living trees, freshly felled logs and unseasoned timber which has a fairly high moisture content. The adults bore directly into the wood making holes, circular in cross-section, ranging from minute punctures to holes of $\frac{1}{8}$ in. diameter. These holes are known as pin holes or shot holes. The beetles live mainly on fungi cultivated in their tunnels.

(2) *Powder-post beetles*

There are two main types *viz* the Lyctus beetles and the cylindrical powder-post beetles.

Partly-seasoned or seasoned timber is subjected to attack by both beetles. Lyctus beetles do not bore into wood but lay eggs in the pores or cracks. Cylindrical powder-post beetles sometimes bore into the timber to lay eggs, or they may lay eggs in the pores or in the cracks. All the damage is done by the larvae, making long, irregular tunnels. Generally only sapwood is infested because it contains relatively more starch and starch is the main food for the larvae.

(3) *Longhorn beetles*

A number of species attack the living tree or logs and the larvae of most of them may persist for some time in sawn timber during seasoning. A few species attack seasoned timber. Tunnels caused by larvae are elliptical in cross-section and are about $\frac{1}{2}$–1 in. diameter. Each tunnel is occupied by only one larva.

(4) *Carpenter bees*

These commonly attack rafters of covered ways and roofing timbers of open sheds. They bore into the wood making cylindrical tunnels of $\frac{1}{2}$–1 in. diameter. An egg is laid in a cell formed in the tunnels with bee-bread on which the larva feeds.

(5) *Termites*

Termites are the most injurious wood-feeding insects in existence. They live primarily on cellulose in wood; they also eat lichen, algae, grasses and fungi. There are two distinct groups of termites, the sub-terranean and dry-wood termites.

Subterranean termites exist in contact with moist earth where tunnels are built from the soil to the source of food e.g. timber. Tunnels can be built over almost any unpalatable material, but they avoid long traverses over metallic surfaces and they cannot easily get round knife-edge corners. When timber is attacked it is hollowed out, leaving an outer shell filled with solidified soil.

Dry-wood termites live in small colonies in dry, sound, seasoned wood and require no access to the ground. They enter through joints, cracks, fissures, rough surfaces and decay parts. Once an entry is made they seal themselves in the wood to develop and destroy, eventually leaving only a thin outer shell.

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Fire

Just because wood is a combustible material it does not necessarily mean that in case of fire a timber house is more risky to human lives than a house built of any other common building material. In fact practical experience and actual demonstrations have shown that the fire risk to human lives could be less in timber houses. The logic of this assertion is not difficult to follow if one analyses the behaviour and performance of the timber members of a timber house which is on fire.

To begin with, under normal circumstances a fire is very seldom started from the material that makes the house, but rather from the content of the house, such as the curtain, furniture, paper in a waste paper basket, kerosene lamp, etc. This is reflected in the fact that many steel, brick and concrete buildings have been destroyed by fire.

As a general rule, if a house has been on fire, the part of it that has been burnt has to be renewed before it is suitable for re-occupation, be it made of timber, steel, brick or concrete. The reason is that whereas timber building parts can be rendered un-reusable by fire which chars it or burns it, under the same circumstance a brick wall or steel structure can also be damaged structurally, due to cracking or buckling. There is therefore no point in considering the question of how much of the building can be saved from a fire. At any rate the far more important problem in case of fire is the safety of human lives. In this respect if properly designed, timber can be even safer than other building materials. A timber structure with members of heavy cross-section can often hold on longer in a fire before collapsing, hence giving the occupants in the house the extra time vitally needed to evacuate to safety. It is well known that when a thick piece of wood is set on fire, the burning at first causes the outer surfaces to char and form an outer layer of charcoal, which in turn causes the wood to burn at a slower rate. On the other hand when its temperature is sufficiently raised, a concrete or steel structure will crack and buckle and collapse suddenly, without itself showing any outward sign of combustion. This is very dangerous, as it does not give prior warning and sufficient time to the people concerned to escape from the burning house.

USES OF TIMBER IN THE ESTATE

Timber is suitable for many uses in the estate. It can be used as trolley sleepers, fence posts, pallets, farm sheds, quarters, bridges, buildings, etc.

Trolley sleepers

Trolley sleepers are required to support loads transmitted from the trolley through the steel rails. The main consideration is to use timber with adequate compressive strength perpendicular to grain to resist rail-cutting force and to have a low tendency to split. It is considered that a timber that has an allowable compressive strength of 60–80 lb/sq. in. is mechanically sufficient.

Species of heavy hardwood are naturally durable and can be used untreated provided sapwood is omitted or limited, as sapwood is always liable to attack by fungi and insects because of its higher starch content. For non-durable timbers they must be amenable to preservative treatment so that they can be adequately treated to prevent fungi and insects attack. The preservative used must be toxic to fungi and insects and must have the property to prevent or minimize surface checks due to undue shrinkage. Plain creosote or a mixture of creosote and diesel fuel are common preservatives used. Water-borne salt of copper-chrome-arsenate has been found through service tests to be suitable also for trolley sleepers.

Sleepers should be laid on well-drained ground to avoid dampness suitable for the growth of fungi. The area must be kept clean to discourage the growth of fungi and termites. For peaty soil, ballast should be provided.

Pre-drilling the spike hole is recommended to prevent splitting when spiking. Otherwise water collected in the split may cause fungus to grow and hence rot at the spike hole.

A series of service tests on trolley sleepers consisting of 7 936 pieces of 5 in. × 4 in. × 4 ft and 5 in. × 3 in. × 4 ft Kempas timbers pressure-treated with Tanalith U (Fluor-chrome-arsenate) of average 0.5 lb/cu. ft dry salt retention was investigated in 1955 in an oil palm estate. The test was discontinued 7 years after it was laid because of missing numbers labels on sleepers, making identification impossible. However the estimated service life is at least 9 years. At about the same time, 2 000 pieces of Kempas trolley sleepers were pressure treated with 25/75% of creosote/diesel fuel mixture and put in service test. After 10 years, seven pieces were replaced out of one hundred inspected.

By the end of 1966, another series of tests was started on 200 Keruing and Kempas sleepers. About half of them were pressure-treated with 50/50% creosote/diesel fuel mixture and the others with copper-chrome-arsenate. These sleepers were placed at regular intervals along with steel sleepers. The following table gives details of the experimental design:

Types of preservative	*Keruing sleepers*		*Kempas sleepers*	
	Number	*Absorption/dry salt retention (lb/ft³)*	*Number*	*Absorption/dry salt retention (lb/ft³)*
50/50% creosote/diesel	50	4.96	57	14.69
C–C–A	50	0.74	43	0.08

At the inspection in 1974, that is after 8 years in service, it was found that all the sleepers were still in a sound and serviceable condition, so were the steel sleepers.

From the above and other tests, it is shown that timber can be used as trolley sleepers after proper preservative treatment. With the increasing number of commercial pressure treatment plants for copper-chrome-arsenate preservative, timber can readily be treated. Unfortunately there is no pressure-treatment facility for creosote preservative in Peninsular Malaysia. Nevertheless a simple method of treatment using a simple makeshift facility can be applied in the estate, especially for those amenable species. In this method, the timber is submerged in the cold preservative in an open tank. The preservative is then heated by direct firing to a pre-determined temperature usually between 180° and 220°F, and the temperature is maintained for a fixed period. The timber and hot preservative are then allowed to cool down. In this so-called "hot-and-cold bath" system the final phase of the treatment, in which the timber is left in the preservative to cool, is important. In cooling, the hot air in the cell cavities of the timber contracts, thereby helping to draw in further absorption of the preservative.

Fence posts

Fence posts are normally round poles of mixed species. Except for a few very durable species, untreated posts usually last only about 2 years or less due to the attack by fungi and insects. Preservative treatment for posts will definitely improve their useful life.

Such green round poles from the forest should be immediately stacked for seasoning so as to reduce the risk of fungi attack during storage.

The top end of the posts should preferably be chamfered to allow rain water to run off easily instead of collecting on the top or inside the end checks or splits, thereby causing end rot to develop. The use of a metal cap serves the same purpose.

Preservative treatment should be carried out on all round fence posts to prolong their service life even if the timber is of a durable species. One advantage of using round poles is their outer ring of sapwood which is amenable to preservative treatment, enabling simple processes such as cold soaking and open tank methods to be applied.

A series of service test on two hundred poles of mixed species treated with 50/50% creosote/diesel fuel mixture open tank method was started in 1952. Until now inspection of these poles is still in progress. The latest result shows that after 22 years in service, only two poles have been replaced and ten poles although badly split are still serviceable.

Building construction

To make estate timber buildings durable, efficient and yet cheap, the following steps should be adopted:

(1) *Correct design*

Unsatisfactory performance and even early failure of the timber may ensue from poor building design and lack of knowledge of the fundamental principles of good timber construction.

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Since the initial risk of fungal infection can be removed by reducing the moisture content to below the level necessary for the growth of fungi, timber to be used must be appropriately sound and dry before it is installed. The design should provide adequate protection to the timber from dampness and reabsorption of water. Adequate and good ventilation should also be provided and maintained thereafter.

To protect wooden stilts against damage by rot of subterranean termites, they should be encased in cement or raised on precast concrete heelstone with weathered top to throw off rainwater and/or provided with a groove for oil.

In the case of wooden floors resting on brick piers, a metal barrier of zinc, copper or galvanized iron is commonly used to prevent termites climbing from the brick piers to the floor, and at the same time to act as a damp-proof shield. Sometimes strong, dense concrete with a bituminous layer between concrete and timber sill is specified for timber building.

(2) *Species selection and strength grouping of timber*

For timber houses in the estate, the use of a particular species of timber for certain building components only should be avoided. Mixed species should be used as much as possible to achieve economy without the loss of efficiency. It is almost always true that apart from the specified species for the particular component there are many other timber species which are just as suitable for the component. The acceptance of all the suitable species means the acceptance of also the lesser-known and lesser used species, and this enables the timber to be supplied at a cheaper price, contributing at the same time also to the fuller utilization of the forest produce.

Owing to the very mixed nature of the Malaysian forest, except for a relatively few timbers it is difficult to supply large quantities of any single timber at one time. In order to overcome this difficulty, timbers of very similar strength properties are grouped together. The classification of timbers into strength groups is based on the results of intensive research on the basic mechanical properties of the timber species concerned. *Table 1* indicates the strength grouping of some Malaysian timbers. *Tables 2* and *3* indicates the basic and grade stresses for four strength groups in the green and air-dry conditions respectively.

The use of strength groups for timbers eases the problem of timber selection. The groups are so adjusted that the weakest timber in each group has a grade stress that is not less than the grade stress for that group.

Generally timbers for building and construction in the estate can be classified as heavy construction timbers, medium construction timbers and light construction timbers.

For heavy construction purposes such as bridge, beam and post or column, the strength requirement should be of strength group B and up. For medium construction such as trusses, joists, girdles, rafters and purlins it should be of strength group C and up. For light constructional purposes such as door and window frames, sidings, etc. it should be of strength group D and up.

In using mixed timber species it is likely that timbers of different colours are supplied together. This however should not be objectionable for estate houses. Moreover the difference in colour can be easily hidden by paint or a cheap but effective dark-coloured wood stain such as the Madison finish.

Table 1. Strength groups

Group A	*Group B*	*Group C*	*Group D*
Balau	Kapur	Bintangor	Damar Minyak
Balau, Red	Keledang	Durian	Geronggang
Bitis	Keruing	Gerutu	Jelutong
Chengal	Kulim	Kedondong	Pulai
Giam	Mengkulang	Kungkur	Sesendok
Kekatong	Merawan	Machang	Terentang
Kempas	Merbau	Medang	
Keranji	Merpauh	Melantai	
Mata Ulat	Minyak Berok	Melunak	
Mempening	Perupok	Mempisang	
Mertas	Punah	Meranti, Bakau	
Nyalas	Rengas	Meranti, Dark Red	
Penaga	Resak		
Tualang	Tembusu	Meranti, Light Red	
		Meranti, White	
		Meranti, Yellow	
		Mersawa	
		Penarahan	
		Ramin	
		Sepetir	
		Simpoh	
		Tabah Merah	
		Terap	

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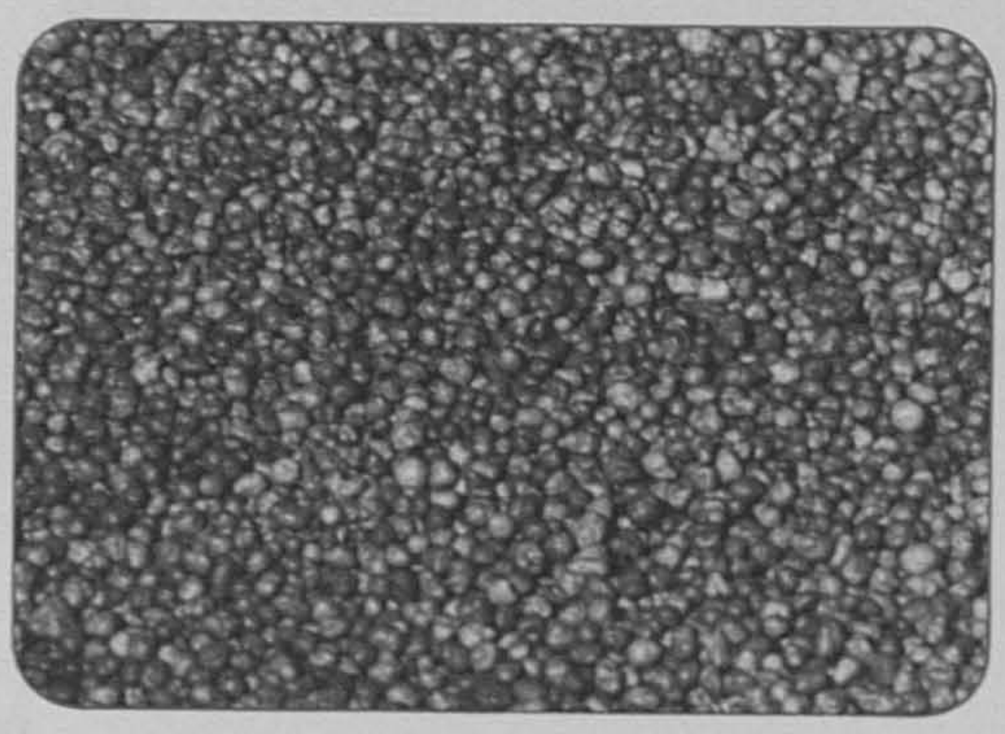

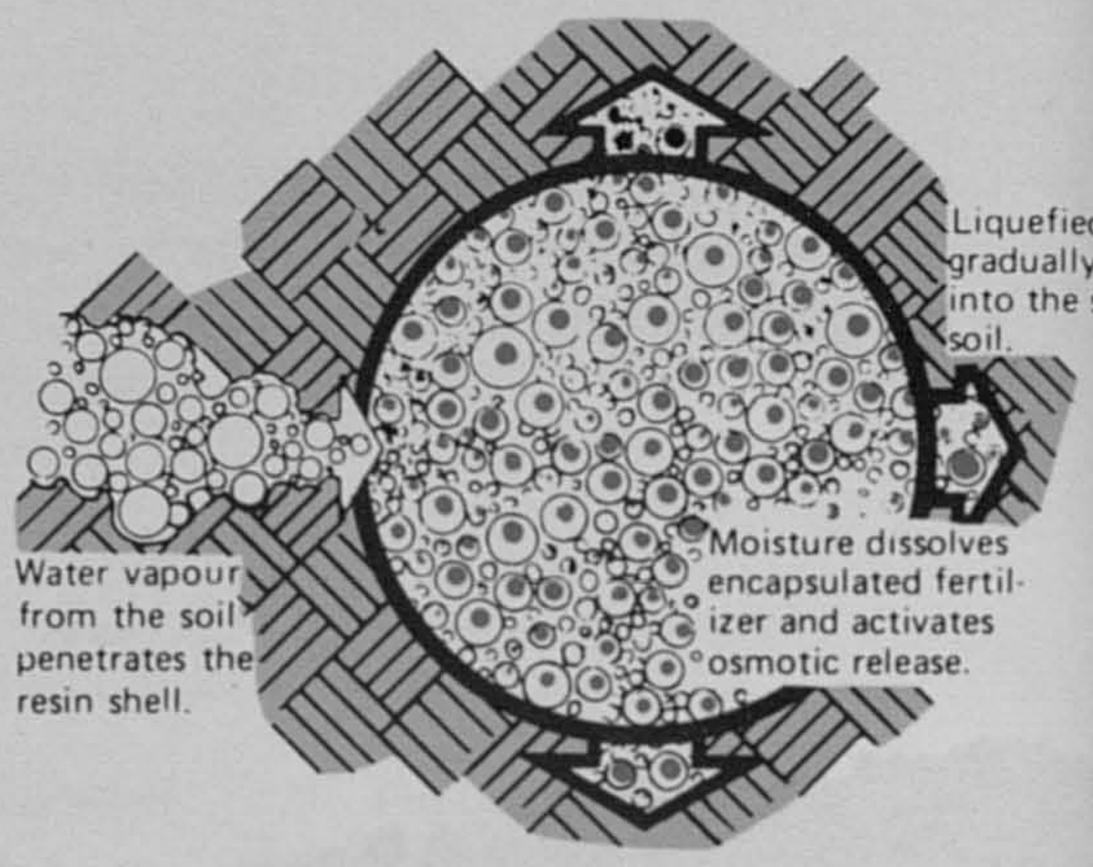

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Table 2. Green grade stresses for four strength groups

Strength group	*Grade*	*Bending and tension parallel to grain (lb/in.²)*	*Compression parallel to grain (lb/in.²)*	*Compression perpendicular to grain (lb/in.²)*	*Shear parallel to grain (lb/in.²)*	*Modulus of elasticity (lb/in.²)*	
						Mean	*Minimum*
A	Basic	3 000	2 500	250	400	2 000 000	1 250 000
	Select	2 400	2 000	210	280		
	Standard	1 850	1 550	200	220		
	Common	1 500	1 250	180	180		
B	Basic	2 500	2 000	150	300	1 600 000	900 000
	Select	2 000	1 600	120	210		
	Standard	1 500	1 250	120	160		
	Common	1 250	1 000	110	130		
C	Basic	1 800	1 400	100	200	1 300 000	750 000
	Select	1 400	1 100	85	140		
	Standard	1 100	850	80	110		
	Common	900	700	75	90		
D	Basic	1 100	950	60	200	830 000	430 000
	Select	850	750	50	140		
	Standard	650	550	45	110		
	Common	550	470	40	90		

(3) *Seasoning and preservation practice*

As soon as possible after conversion sawn timbers should be seasoned to a suitable moisture content before being put to use.

The use of properly-seasoned timber will ensure that the unavoidable shrinkage and distortion that occur in timber during drying have taken place before it is used in building construction. This is important especially in uses which require limited tolerance and good fitting, such as doors, window frames and furniture.

Another advantage of properly seasoned timber is the reduction in weight. This reduction facilitates easier handling and reduces transport charges. Together with reduction in weight, strength starts to increase from the fibre saturation point (25–30% moisture content) and will be as much as 50% higher when the moisture content is down to 15%. The use of seasoned timber also means better utilization of timber's properties.

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Table 3. Air dry grade stresses for four strength groups

Strength group	*Grade*	*Bending and tension parallel to grain (lb/in.²)*	*Compression parallel to grain (lb/in.²)*	*Compression perpendicular to grain (lb/in.²)*	*Shear parallel to grain (lb/in.²)*	*Modulus of elasticity (lb/in²)*	
						Mean	*Minimum*
A	Basic	3 660	3 230	280	470	2 140 000	1 400 000
	Select	2 900	2 550	230	330		
	Standard	2 300	2 000	220	260		
	Common	1 800	1 600	210	210		
B	Basic	2 880	2 330	180	310	1 700 000	950 000
	Select	2 300	1 850	150	220		
	Standard	1 800	1 450	140	170		
	Common	1 400	1 150	130	130		
C	Basic	2 100	1 600	110	210	1 350 000	800 000
	Select	1 650	1 250	90	150		
	Standard	1 300	1 000	80	110		
	Common	1 050	800	80	90		
D	Basic	1 400	1 200	90	200	950 000	450 000
	Select	1 100	950	75	140		
	Standard	800	750	70	110		
	Common	700	600	65	90		

Sapwood is inferior to heartwood not in its mechanical properties, but in its susceptibility to fungal and insect attack. On the other hand it can be readily impregnated with preservatives and by this means it can be made at least as durable as the heartwood or even more durable. Similarly non-durable timber after being impregnated with preservatives will have as long or even longer a life than the naturally durable timbers. Generally non-durable timbers including the cost of treatment are cheaper than sap-free naturally durable hardwoods.

It is important however that timber used in the estate be treated with a suitable preservative to the specified absorption.

The selection of a suitable preservative and preservation process depends on the conditions in which the timber is used, the degree of protection desired, and the treatability of the timber used. Some timbers are amenable to preservatives, some are refractory. Knowledge of the treatability of many timbers has been obtained through research. *Table 4* gives the treatability of some Malaysian timbers based on the ease of pressure impregnation with creosote. The amount of absorption required of the preservatives depends on the species of the timber, the type of preservative, the mechanical life of the timber required, the percentage of sapwood, the position and the climatic conditions in which the timber will be used.

Table 4. Treatability of Malaysian timbers to preservatives

Extremely easy absorption 20 lb/cu. ft or over	*Very easy 12–20 lb/cu. ft*	*Easy 6–12 lb/cu. ft*	*Average 6–8 lb/cu. ft*	*Moderately difficult 4–6 lb/cu. ft*	*Difficult 2–4 lb/cu. ft*	*Very difficult 0–2 lb/cu. ft*
				Balau (b) Chengal	Balau (a) Bitis Keranji	Balau (a) Balau, Red Giam Merbau Resak Tembusu Membatu Tempinis Penaga
		Kempas Keruing (b) Simpoh Tualang	Kulim Perupok Mengkulang	Kapur Merawan (a) Punah Pauh Kijang	Minyak-Berok	Kasai Kelat Keledang Keruing (c) Rengas Perah Petaling
Geronggang Jelutong Melawis Mempisang Sesendok Bengang Ludai Jangkang Ara berteh Damar minyak	Durian Penarahan Machang	Meranti white Para Rubber	Merawan (a) Meranti yellow Sepetir Terentang	Kerantai Batai	Bintangor Medang (a) Meranti dark red Meranti red Mersawa Terap Sepul Pelong Kungkur	Kedondong Medang (a) Melunak Nyatoh Nipis kulit Dedali Gapis Gegatal

Note (a) Depending on the botanical species.

(b) Most species of Keruing.

(c) A few species only.

(4) *Inspection and maintenance*

Regular inspection and maintenance of timber building is necessary to detect signs of attack by fungi and insects and to check further infestation.

Pin holes, frass (borer dust) on the surface, cracks, noise of carpenter bees, and borer tunnels are signs of insect attack which should be looked for in the inspection. Prodding with a knife or spike into the timber surface is another way of detecting fungal and termite attack.

Maintenance work should be carried out if necessary after inspection. For fungal attack, the fruiting bodies of fungi should be sterilized by means of a blow lamp followed by a spray of fungicide such as borax, or gamma or pentachlorphenol. Then the timber with visible sign of infection should be scrapped and the sound timber nearby and adjoining brickwork disinfected again. Timber heavily infected should be replaced.

Two or three application of a solution of paradichlorbenzene in kerosene or a solution of ortho-dichlorobenzene at weekly intervals is one treatment to stop the attack by powder-post beetles in timber; whereas the injection with a solution of paradichlorbenzene in kerosene into the bored holes will stop active attack by longhorn beetles and carpenter bees. To stop subterranean termite infection, one method is the destruction of their galleries by puffing white arsenic dust into these, followed by soil poisoning. In the case of dry-wood termite, dry white arsenic, sodium fluosilicate, DDT or gamma BHC may be used by pumping into $\frac{1}{4}$–$\frac{1}{2}$ in. diameter holes drilled in the infested wood at intervals of 2 or 3 feet. Saturation of the infested timber with a solution of paradichlorbenzene or orthodichlorobenzene in kerosene or a 5% concentration of pentachlorphenol in light petroleum fuel oil will give the same effect.

The proper maintenance of a timber house includes the regular renewal of paint or similar protective coating. The ground outside, and underneath the building in the case of the building standing on stilts, should be kept clean and clear of vegetation growth which is inducive to fungal growth. Water-repellant preservative treatment of wood may be applied both before painting and also as a natural finish for exterior wood.

(5) *Fire*

The fire resistance of timber can be increased by pressure impregnation or by brushing with a fire retardant. It may not be considered very necessary to apply this type of treatment to buildings in the estate. But precautions such as the provision of fire buckets and/or chemical fire extinguishers should be taken. Fire hazard can be reduced by keeping inflammable or highly combustible materials away from the source of flame.

CONCLUSION

With the increasing technological advancement and scientific knowledge in modern timber engineering with regard to both timber properties and fundamental principles of timber construction, timber today is as good as or better than other engineering materials.

Through intensive research on timber science and technology, timber's useful life can be prolonged and its natural properties can be improved by artificial means.

There is very little doubt that the suitability of timber for estate use in Malaysia is better established than ever, if sound engineering practices and efficient utilization of timber's properties are maintained and enforced. The economics and engineering advantages of using timber as a material for structural construction in the estate exist for those who are concerned to exploit them. Timber is of local, renewable material which is cheap and easily available. Furthermore the use of timber in building construction will help to support the local wood-based industry and save significant amounts of foreign exchange for the nation.

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Letter to the Editor

Dear Sir :

TO PRE OR NOT TO PRE.....

.....that is the question I wish to discuss in this note. Every conference on agricultural subjects in Malaysia feels obliged to issue a bag or packet of loose preprints, which is the written version of papers to be presented. Sometimes these are received well in advance of the conference, sometimes on the day itself, and sometimes "pre" becomes something of a misnomer and they are issued after the paper is delivered. As a matter of fact, complete preprints of this kind are quite rare in similar conferences elsewhere in the world. I wish to express the view, *via* these columns that though sometimes useful, preprints are often unnecessary, and even in some ways a disadvantage.

I find myself sometimes these days involved in the organizing of conferences, and my policy is to raise objections at the first committee meeting, but then accept the opposite majority view to produce preprints, like a good democrat (*i.e.*—usually there are only one or two delegates with very strong views either way, and the opposition tend to be bigger than me). However, I would like to know what the Planters, who in this context (and if they will forgive the expression) may be called the grass roots, and other readers, think about the matter. I have formed the impression that few people read the preprints before the papers are delivered, except those closely involved in the particular fields. More, no doubt, read them later, stimulated by good delivery or a special interest which is raised during the delivery.

Advantages are that one can judge in advance the quality and relevance of the material that is to be presented, so that in the event of competition for time on the programme, selection can be made. Also preprints are said to stimulate and focus discussion. My experience is that discussion is in fact frequently on minor issues on the fringes of the subject, notwithstanding the preprints.

There is, I believe, a practical alternative—that is to produce a booklet of summaries of around one or two thousand words which would equally or better serve these requirements. Authors would not feel that these summarise committed them to the final form of the paper, and would therefore be much less inhibited, pending final perfection, about meeting deadlines. (Under the present system, authors tend to assume that once their paper has been put on to the conference programme they can expect quite a bit of leeway on this deadline—usually correctly). Full papers would be submitted as typescripts, at the latest at the time of the conference. If not forthcoming then, they would be omitted from the Proceedings. Since the main aim of authors is to get into print, this should produce a satisfactory spur.

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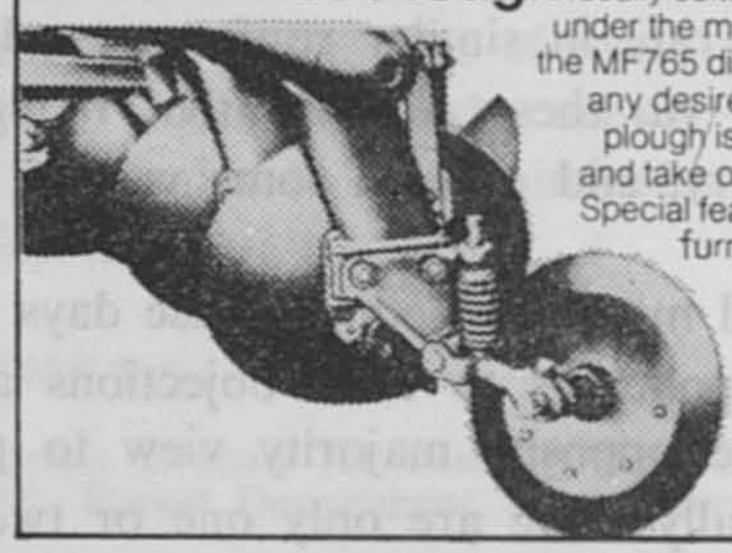
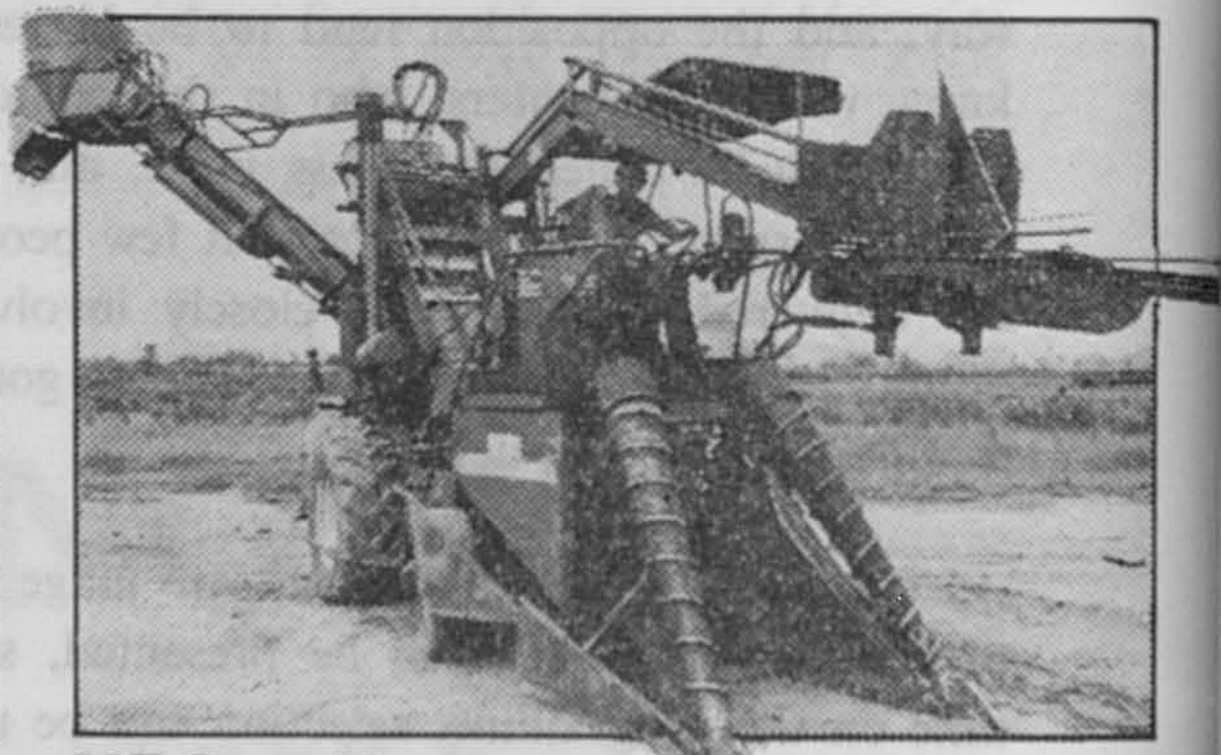


Ideally suited to efficient ploughing under the most adverse conditions, the MF765 disc plough can be set to any desired depth. Attaching the plough is an easy one-man task and take only a matter of minutes. Special features include a floating furrow wheel that ensures effective side draft control, allows quick penetration. And disc scrappers are adjus – table to meet any soil condition and ensure proper trash coverage.

MF 587 Rice Combine

The MF587 rice combine is developed and engineered specifically to meet the exacting demands of tropical rice harvesting. As a high performance rice machine, it is available in high or low specification form — utilising tracks or high floatation tyre options. While operating efficiently in irrigated paddy conditions, the MF587 rice combine is ideal for use in areas practising double or even triple cropping schedules.



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Easily the world's top selling cane harvester. Operating in numerous sugar producing countries in both hemispheres, it has a proven ability to do a clean ground job. Gives a most consistent output of clean-cut, uniform-length billets. Produces a sample with low dirt and trash content. Delivers fewer damaged billets and maintains a consistently higher flow rate than any other comparable single-row cane harvesters. The MF has no equal for high output, extreme versatility and downright dependable performance,

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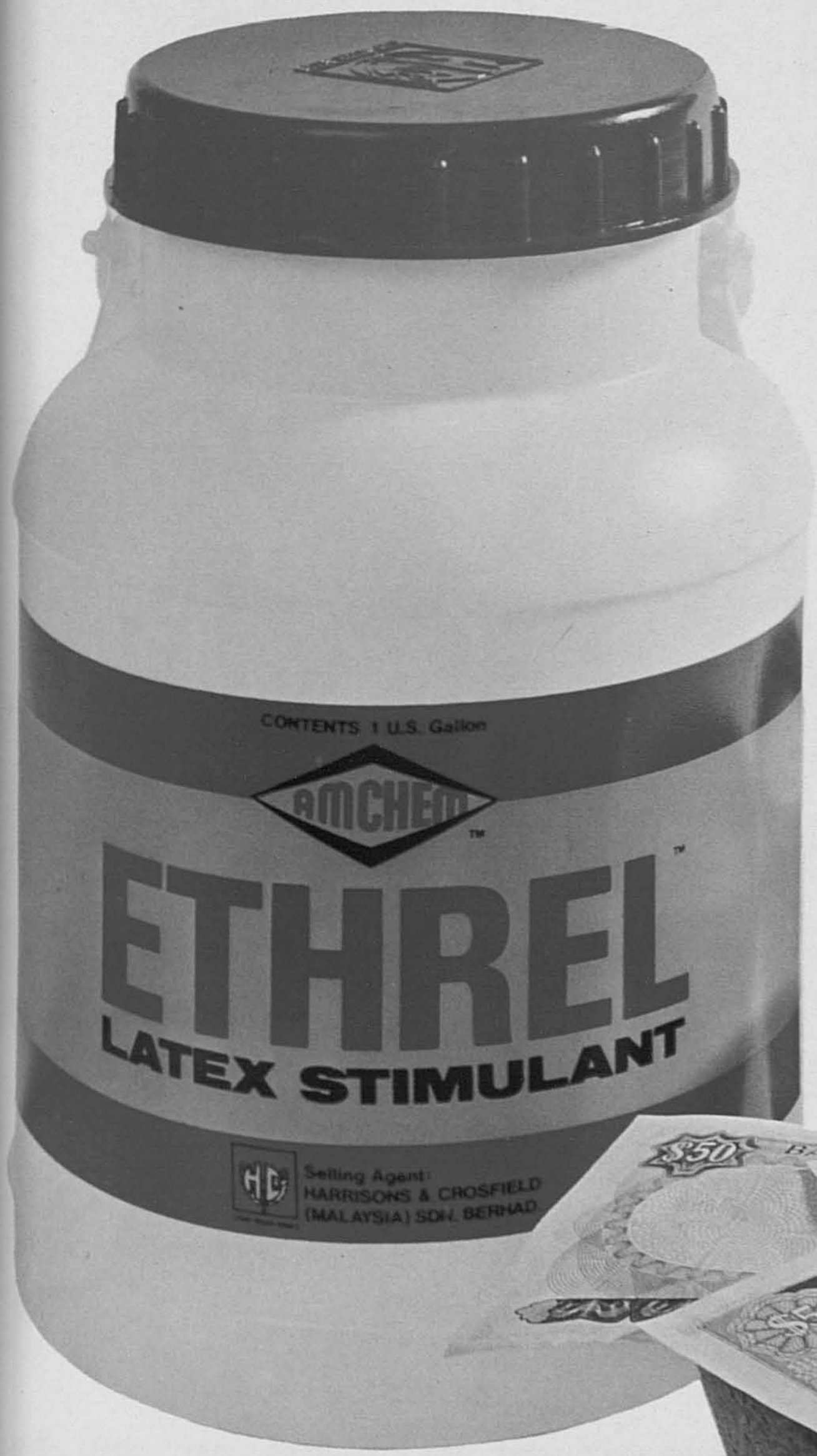

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ETHREL is far superior to all other latex stimulants in providing consistent results and in being weather resistant. It does not have any injurious effects on the rubber trees. In addition, ETHREL works very rapidly: penetration of the active ingredient takes place within half an hour to two or three hours.

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If this were done, paper reviewers and prospective editors would not be satiated in advance of the conference, the editors could be appointed and meet during the Conference, and commence work immediately. Presently there is often a long gap for every one to recuperate, which delays the publication of proceedings considerably. The subject matter would then be up-to-date at the time of delivery and publication. Additionally, there would be much less expense in printing, less frantic last-minute despair by organizers, and an end to the confusion through having two versions of the same paper in the literature.

I hope that others will respond with their views on this matter.

Yours

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The monthly crop

ILO recommendation on dismissals. An ILO Recommendation on termination of employment has had an important impact on laws governing job security in over 40 countries in the 13 years since its adoption.

This instrument established as international minimum standard the principle that a worker should not be dismissed from his job without a valid reason connected with the capacity or conduct of the worker or the operational requirements of the undertaking.

Certain specified reason should never justify dismissal, according to the Recommendation. These include trade union membership or activities; filing certain complaints or participating in proceedings against the employer; race, colour, sex, marital status, religion, political opinion, national extraction and social origin.

The instrument provides that a worker should be entitled to appeal against his dismissal to a neutral body for reinstatement or compensation. It also contains special provisions dealing with workforce reductions.

Adopted by the International Labour Conference in 1963, the Recommendation influenced or inspired national action in such countries as Cambodia, Cyprus, Panama, Rwanda and Zaire, where the legislation was drafted with the assistance of ILO experts.

Other examples of such influence are India, where a 1971 amendment aimed at implementing certain of the Recommendation's provisions, and in the United Kingdom, where the unfair dismissal provisions adopted in 1971 were designed to give effect to a government undertaking to implement the Recommendation.

In addition, more and more countries now place the burden of proof on the employer to show that a dismissal appealed against by a worker was justified. In many other States employers are obliged to secure the prior agreement of a public authority before reducing their workforce.

— Majikan Lombong

'Proof' for Industrial Court. Much has been said about the standard of proof required in the Industrial Court as compared with ordinary Court of Law. In Industrial Court Award No. 59/76 the Court made the following points :

The standard of proof is not as high as required in a Criminal Court where a case is to be proved beyond reasonable doubt. The rules of evidence are not strictly followed, e.g. no evidence of previous background of a person charged with a crime is allowed in a Criminal Court to show that he is likely to have committed it, whereas such evidence of previous misconduct cannot be strictly objected to in the Industrial Court from the point of view of maintaining industrial discipline.

As held in Award No. 30/73 in Industrial Court Case No. 2 of 1973, the alleged misconduct, although not sufficient to establish the elements of a criminal charge may yet be found to be a serious breach of discipline to disrupt industrial harmony. An Award of the Industrial Court, it must be remembered, does not operate as 'autrefois convict' on a Criminal Court nor does it *vice-versa.*

Again, the Industrial Court, unlike the Civil Court, decides a case not to end a human relationship but to see how that relationship could continue as far as possible. Before resorting to the Industrial Court, if the parties have failed to accommodate each other through their own negotiating machinery, they are assisted by the conciliation-services of the Ministry to reach a speedy and amicable settlement.

The Industrial Court is more arbitral than judicial, and it acts "according to equity, good conscience and substantial merits of the case without regard to technicalities and legal form".

The Court's concern in an industrial dispute is to find not who is right but what has gone wrong in the relationship between the parties to have kept them at a snarling distance.

— *Majikan Lombong*

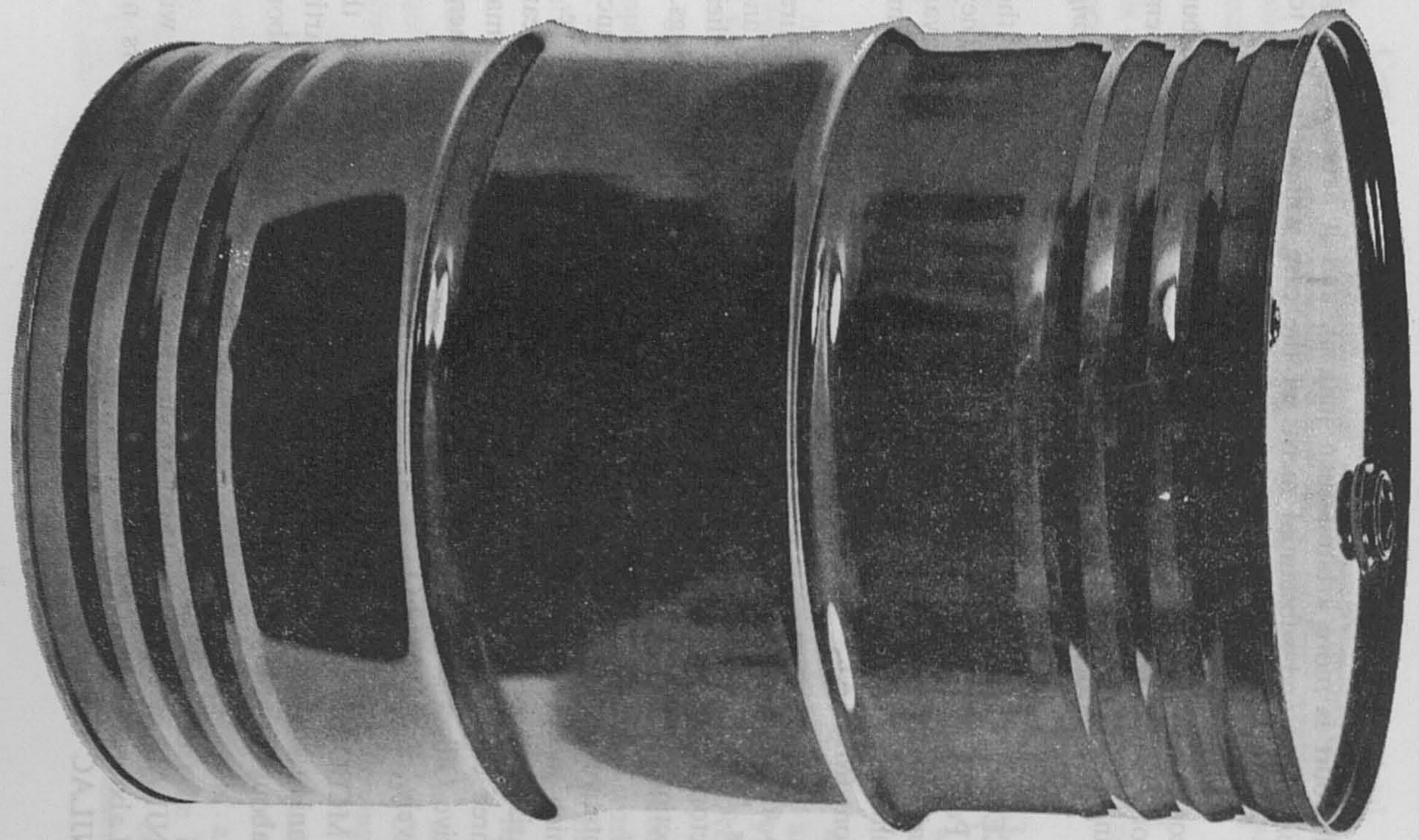
All about the MCEO. The MCEO is the recognized voice of employers in the private sector in Peninsular Malaysia, and has three constituent bodies. They are: The Malayan Agricultural Producers Association (MAPA); The Malayan Employers' Consultative Association (MECA); and The Malayan Mining Employers' Association (MMEA).

While MAPA and MMEA are trade unions of employers in the agricultural and mining sectors, MECA is an association of employers in the commercial and manufacturing sectors. All three constituent bodies provide services to their members in connection with collective negotiations and industrial court hearings.

Four representatives from each of the constituent bodies make up the Council of the MCEO which meets about once a month. The MCEO does not have a permanent secretariat and is serviced on a rotation basis for a period of 2 years by each of the three constituent bodies. For the next two years the Chairman and Chief Executive Officer of MECA will be the Chairman and Hon. General Secretary respectively of the MCEO.

The regular MCEO meetings serve as a means of consultation among the three member organisations and enable them to take a united stand at the tripartite National Joint Labour Advisory Council on any proposals pertaining to labour legislation.

Besides the NJLAC meetings, the MCEO also has a monthly meeting with the Minister of Labour & Manpower at which time it raises any matters not covered at the NJLAC meetings.



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RH 1/76

At international level, the MCEO is a member of the International Organisation of Employers (IOE). The IOE keeps employer organisations informed of worldwide industrial relations trends and advises on any specific problems that members might raise from time to time.

In the field of Industrial Relations, the MCEO has always responded to Government's call for the promotion of industrial peace. MCEO with the MTUC is a signatory to the Code of Conduct for Industrial Harmony and has its representatives on the Hot Line Scheme Panel.

— from an MCEO press release

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Technical Education Scheme

Estate Practice (Rubber) Examination
22nd September 1976

(marks in brackets; examiner's comments in italics)

09.00 hr *Duration : 3 hours*

PART I

Results continue to be disappointing—of seven candidates, two failed badly and the other five achieved minimum pass marks in the P4 bracket.

Question 1 (15 marks)

Describe briefly the method you would use for the establishment of budgrafts. Mention two other methods and give reasons for your choice.

Only 15 marks were allotted to the question, which asks for a brief description of the candidate's preferred method for planting a field of budgrafts. More than one candidate wrote four pages, including details of seed collection, germination, preparing seedling nurseries, and even the establishment of legume covers. Clearly this was unnecessary and wasteful of time; it attracted no credit.

Question 2 (20 marks)

A uniform initial stand of 150 trees to the acre is required on steep land. Describe in detail how you would lay out terraces and space planting points.

The comments made on the same question, set a year ago, are applicable. It is incredible that only one candidate had a reasonable understanding of setting out terraces, and none, the vaguest idea of how to achieve a uniform planting density. This suggests that on some estates rubber trees are being evenly spaced at set distances along terraces to give resultant stands per acre as variable as the distances between terraces.

Question 3 (20 marks)

Describe in detail the root disease policy you would adopt in an immature area replanted from a previous stand of rubber with a moderate root disease history. Your answer should cover the period from the time of land preparation to opening for tapping.

It is the examiner's experience that where answers can be derived from book study (e.g. name the three main root diseases of rubber, and describe their symptoms) candidates achieve high marks. Unfortunately, where questions require some practical knowledge of methods and policies the converse is true.

Question 4 (20 marks)

Write about half-a-page on each of the following :

(a) Protuberances on the tapping panel
(b) Secondary wintering
(c) The three part tree
(d) A manuring schedule for budded stumps from planting to maturity
(e) A 25 years tapping policy for RRIM 600 from opening to replanting

This question was answered very well by four candidates.

Question 5 (10 marks)

Name a clone. Describe the ground conditions you might expect to find under budgrafts of this clone 15 years from planting with a density of 120 trees to the acre. Detail a suitable weeding upkeep policy with estimated costs.

Ample scope was given here for candidates to describe conditions (which should almost certainly be known to them) and an actually adopted weeding policy.

Question 6 (15 marks)

A new rubber company is formed on the acquisition of 5000 acres of jungle from which all commercial timber has been extracted.

Set out how you would propose to develop the estate. Include in your answer—a scheduled rate of planting; choice of planting material; source and propagation of plants.

Perhaps an unusual question—it was intended to be tackled last—which required some thought. Good answers were supplied by the five candidates who were successful in the examination.

Estate Practice (Rubber) Examination
22nd September 1976

(marks in brackets; examiner's comments in italics)

14.00 hr *Duration: 3 hours*

PART II

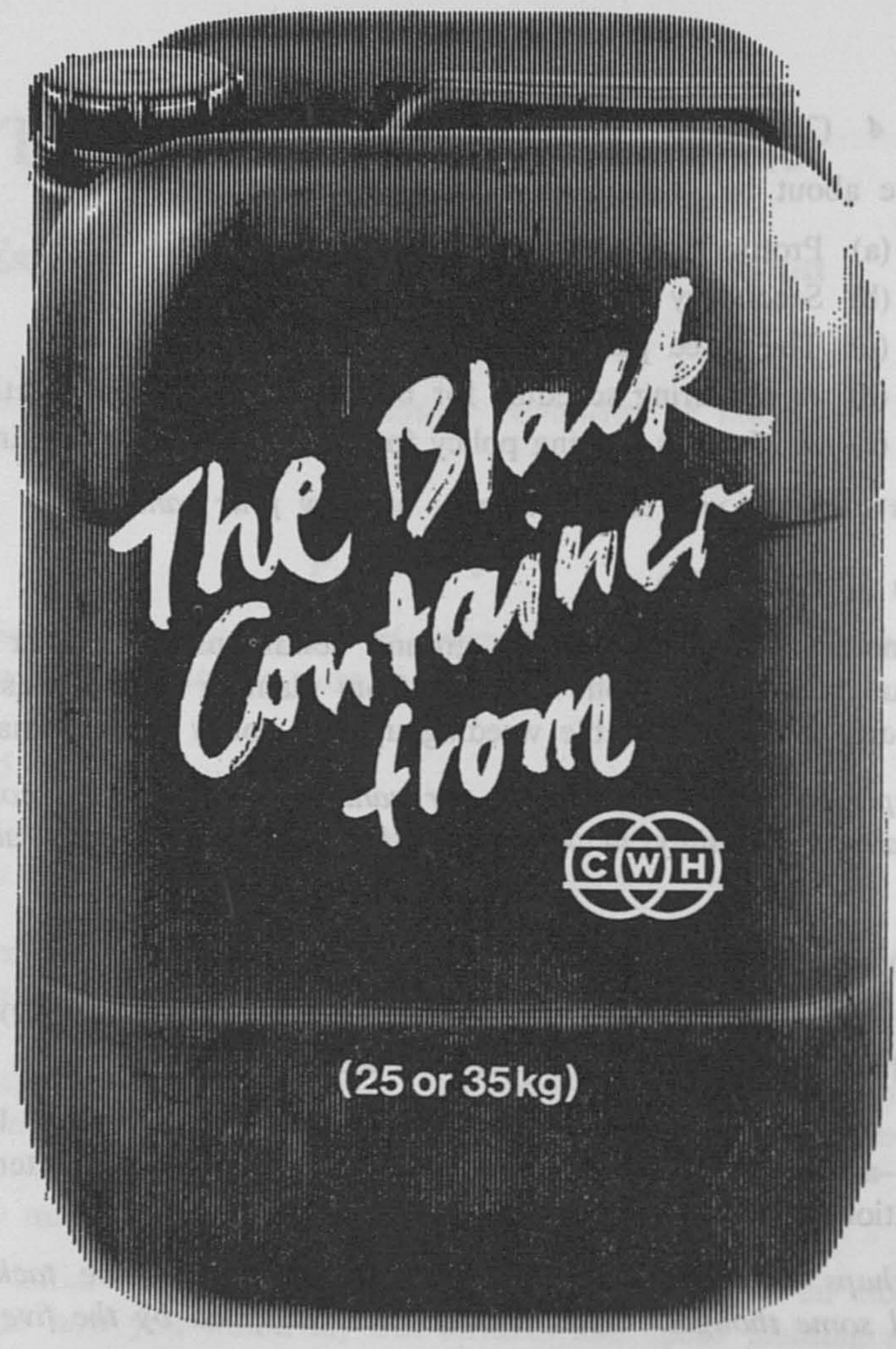
Of the seven candidates sitting this part, four succeeded in obtaining pass marks.

Question 1 (20 marks)

Draw up realistic estimates for the production of:

either — 30,000 soil core budgrafts
or — 30,000 budgrafts growing in polythene bags.

All candidates achieved pass marks for their answers to this question.



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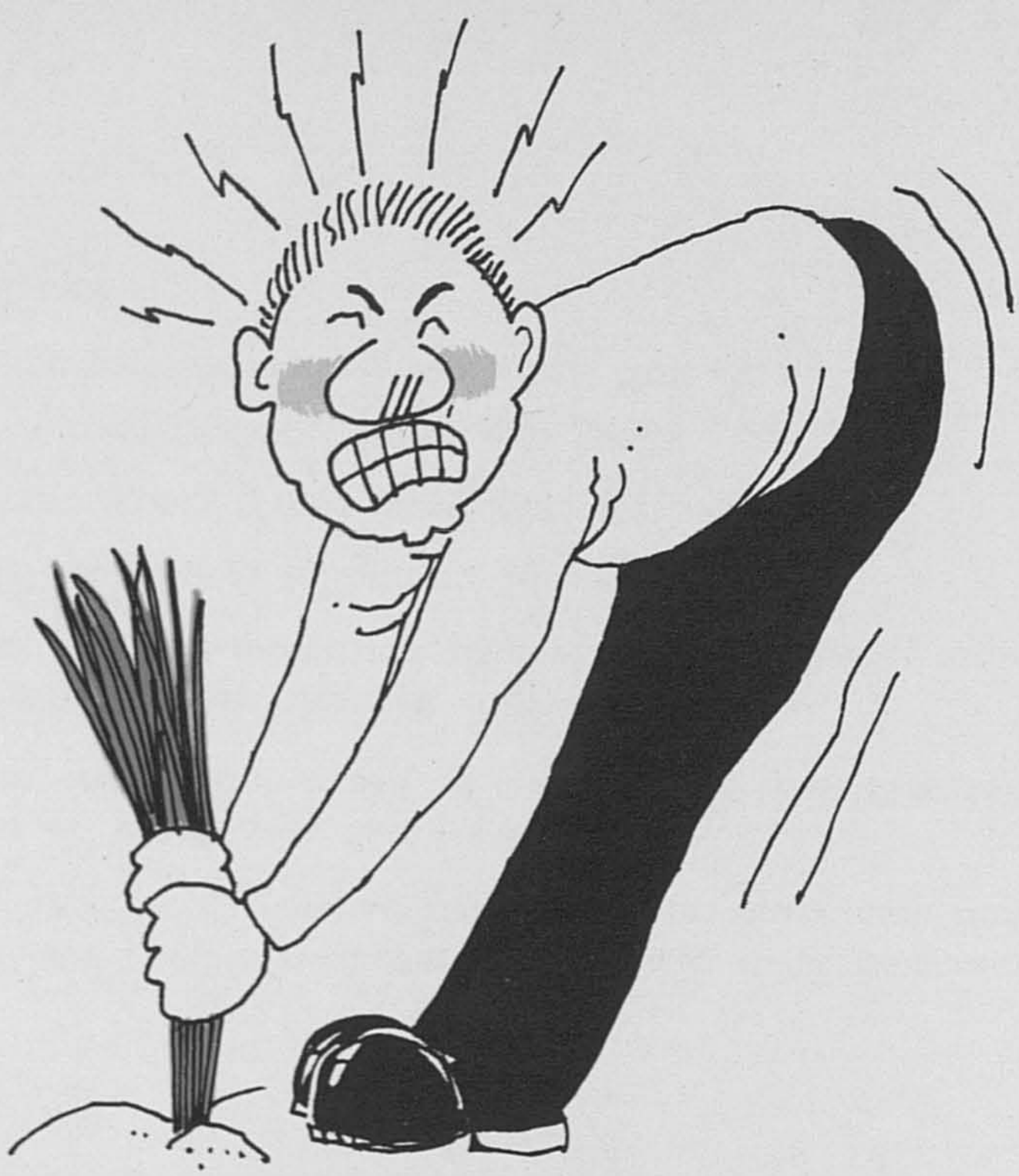

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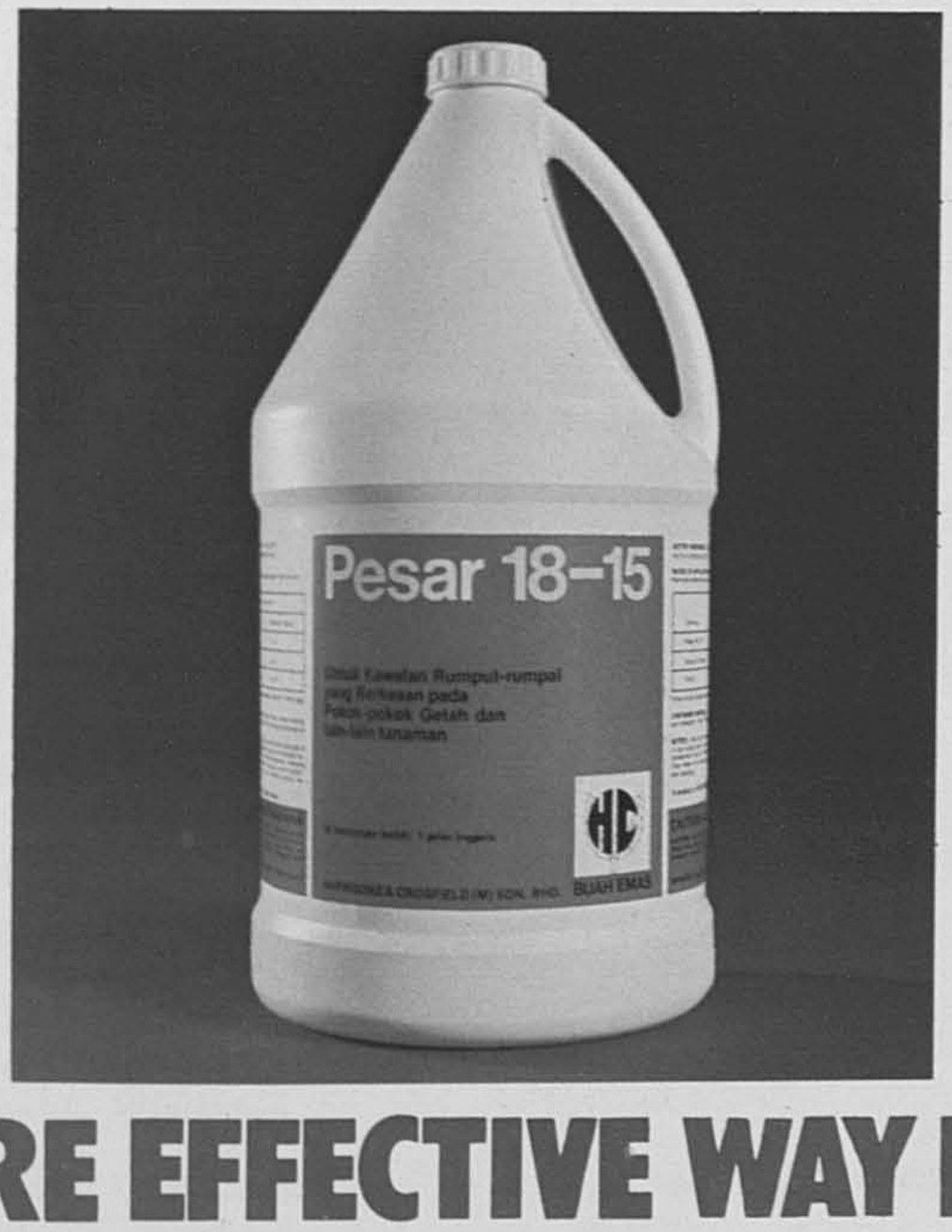

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Question 2 (20 marks)

(a) Describe the construction and component parts of:

either a Hevea crumb drier of your choice

or the Woods (GEC) tunnel drier for sheet rubber.

Sketches may be used to supplement your description.

(b) Write brief notes on the chosen drier, including mention of instructions for use, capacity, and operating costs.

Only one pass mark was obtained here and replies from two candidates were so feeble that no marks were awarded at all.

The question asks for a description of any rubber drier, and candidates presenting themselves for this examination were expected to be conversant with at least one drier.

Question 3 (20 marks)

Write about half-a-page on each of the following:

(a) Anticoagulants

(b) SMR 5 CV 60

(c) RRIM Information Circular No. 84, on Chemical treatment of SMR pallets

(d) Measures which should be taken to protect the environment from pollution

(e) The roll of the RRIM SMR factory inspectorate.

(c) and (e) were thought to be topical and would give candidates least trouble. Surprisingly enough these questions were either omitted or received the poorest marks.

Question 4 (25 marks)

A new agreement between the NUPW and MAPA was signed on 17 May 1976. Answer the following questions.

(a) From what date is the Agreement effective?

(b) What is the duration of the Agreement?

(c) What is the qualification for a high yielding area?

(d) What is the basis for payments to tappers in areas newly brought into tapping?

(e) What is the optimum low level half circumference spiral cut task size in 10–15 years old rubber on flat land?

(f) What constitutes a wash out?

(g) What payment is due to tappers on wash out days?

(h) What was the price zone for August 1976?

(i) Including SRA what was the total daily wage of an adult able-bodied male field worker in August 1976?

(j) How many paid public holidays is a worker eligible for annually?

(k) What is the requirement for a worker to be entitled to paid vacation leave?

(l) What additional allowances are paid to shift workers?

(m) What is required for entitlement to a housing allowance?

(n) Who signed the Agreement on behalf of the NUPW, and who signed on behalf of MAPA?

Congratulations to one candidate for an immaculate answer. He could not have done better with a copy of the agreement before him. Shame on another candidate for scoring a single mark for his knowing that Dr P P Narayanan signed the Agreement on behalf of the NUPW.

Question 5 (15 marks)

(a) Name the variety of mosquito which carries dengue fever.

(b) What is the common habitat of this mosquito and where is its larvae most likely to be found?

(c) What measures would you take to eradicate this mosquito?

All candidates scored expectedly good marks in this relatively easy question.

Social and Personal

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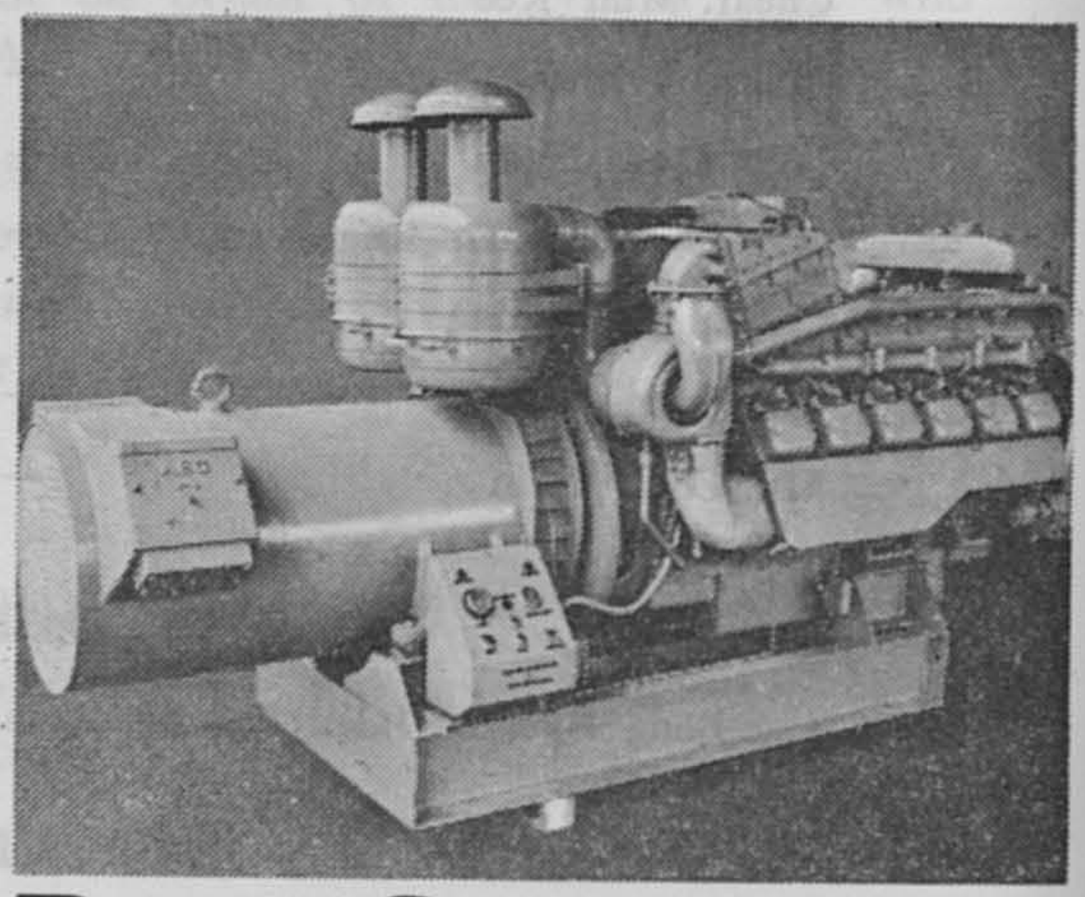

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500 gms pork steak—cut into 1 cm thick pieces and tenderised with a metal tenderiser or the back of a chopping knife
2 dsps fine breadcrumbs
1 dsp thick soya sauce mixed with ½ cup water
2 red tomatoes—coarsely sliced
2 large onions—coarsely sliced
4 dsps vegetable oil or 2 dsps each of vegetable oil and margarine
Pepper and salt

Method:

Heat oil in large frying pan. Add pepper and salt to the slices of pork. Coat each piece lightly with breadcrumbs and fry the pieces, turning over when one side browns. Add the soya sauce and cover pan, allowing pork to simmer till it is cooked. Push the pork to one side of the pan, and fry the sliced onions and tomatoes till they are a little soft, adding more soya sauce and water if more gravy is required.

TAUKWA & VEGETABLES

Ingredients:

4 squares of taukwa—each cut into 6 pieces
1 large carrot—skinned, cut into two lengthwise and coarsely sliced
1 cup snow peas with ends removed
1½ cups cauliflower cut into small pieces
1 red capsicum (red pepper)—cut into 8 wedges after removing pulp and seeds
4 cloves garlic—chopped finely
4 slices fresh ginger
1 level tsp cornflour mixed with 1 level dsp light soya sauce, ½ of a chicken cube and ½ cup water
4 dsps vegetable oil
Salt and pepper

Method:

Heat oil in pan. Fry the pieces of taukwa to brown them, then dish out onto a plate. With the oil left in the pan, fry the garlic till golden brown. Add the carrot, cauliflower, ginger, a little water and salt. Cover pan for about five minutes. Now add the taukwa, snow peas, cornflour mixture and pepper. Cover pan for about two minutes to keep the snow peas green. Just before serving, add the capsicum. Keep pan open.

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