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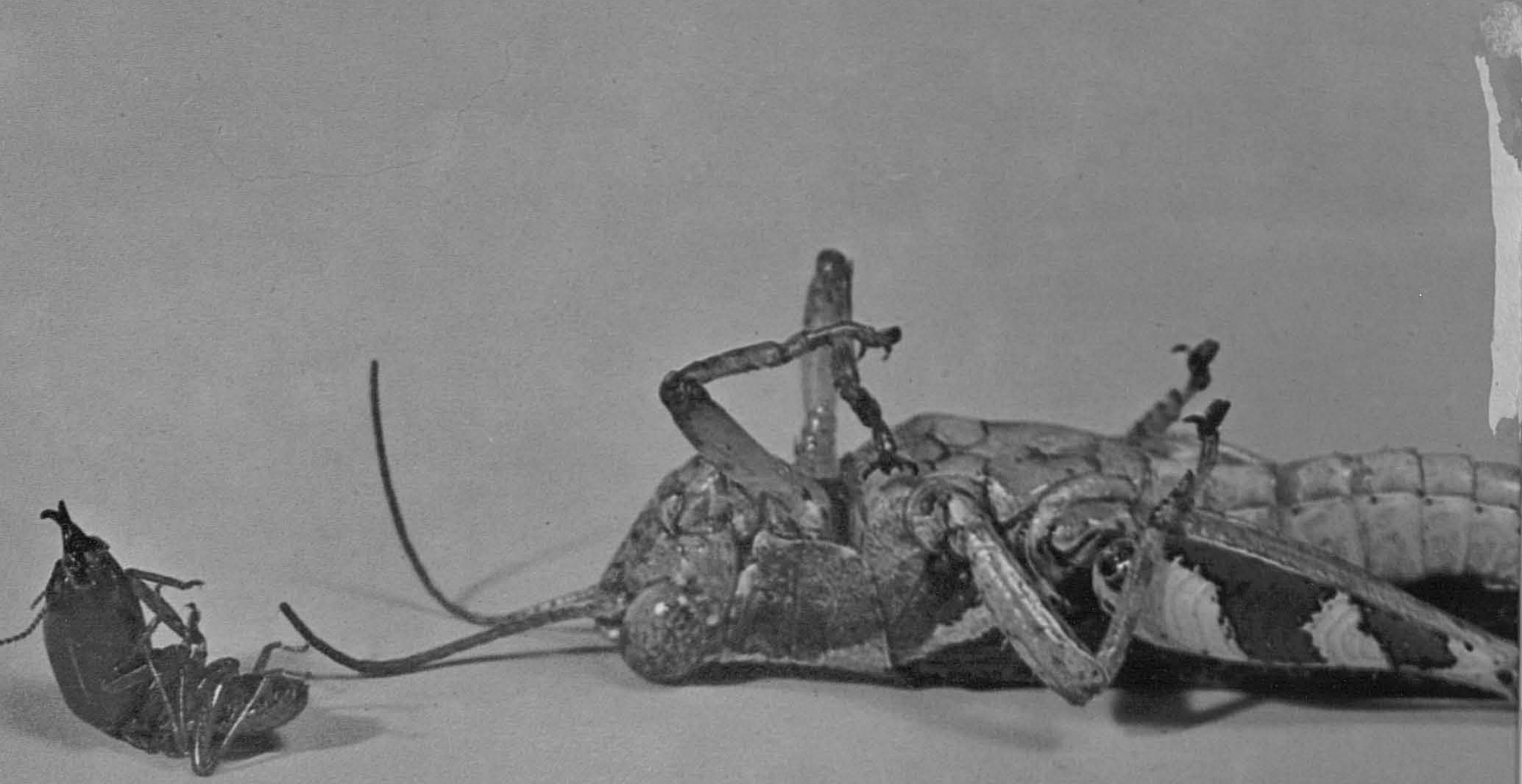

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SENTIASA MAJU

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

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Category B		
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Editorial:

Bukit Takun – a National Treasure

The quarrying of Bukit Takun will result in its total destruction, and the threatened plunder of this beautiful feature of our landscape must be stopped.

Bukit Takun lies in a State Forest Reserve, set aside for the preservation of the plants and animals resident there, and is, with Batu Caves, the most southerly limestone hill in Asia. The limestone terrain in Malaya is largely in hill (Karst) form, and is of extraordinary biological interest. A distinct flora and fauna including a very remarkable cave fauna with many 'living fossils' is preserved only in these limestone hills. The flora includes numerous rare and unusual species, several of which have economic and medical value. Quarrying utterly destroys the habitat. Malaysia cannot afford to waste its natural resources in such a manner. The quarrying process will submit Templer Park, the major park closest to Malaysia's capital city, to noise, dust and other pollutants. It will provide an essentially short-term benefit, of limited economic use, to the quarry operators and their employees; in fact, the limestone is virtually cheaper in value than the labour and expense needed to extract it.

Biologists, biogeographers, geologists and other workers view Bukit Takun as significant in many respects in their fields. Its destruction would render impossible a number of important academic studies.

It is not as though alternative quarrying sites do not exist elsewhere, both in and outside Selangor. Some, such as Batu Caves, ought in fact to cease production. In both Perak and Kelantan there are enough limestone hills suitable for quarrying from which, in concert with natural resource conservation authorities, a judicious selection could be made. Dr Paul Wycherley, Founder Chairman of the Batu Caves Protection Association and the then President of the Malayan Nature Society, writing in this magazine last November urged the quarrying of the subterranean limestone exposed extensively in tin-mining throughout Selangor. He pointed out that the cement factory at Rawang had used underground limestone throughout its existence. With tin-mining devastating the landscape anyway, one might as well take the limestone too, but, said Dr Wycherley "It being cheaper to knock down what stands up, this is again a case where cheapness wins the day."

If a quarry close to Kuala Lumpur is unavoidable, then the subterrestrial sites in the Sungai Besi and Serdang areas should be seriously considered. Quarrying these deposits might involve more expenditure to begin with, but in the long run they would prove more lucrative. At the same time the necessary extraction processes would not be damaging to existing land-use interests or wilderness areas. The sites are mostly under tin-mining, or have been mined and abandoned. They

possess a much larger total amount of extractable material and quarrying could therefore continue longer.

Bukit Takun has immense natural beauty and aesthetic appeal, and the small group of scientists at the University of Malaya who have formed themselves into the Ad Hoc Committee to Save Bukit Takun have produced a proposal which envisages the feature as a recreational resource. This proposal is timely, and worthy of close study. A gratifying number of people have come forward and publicly urged the retention of Bukit Takun as an important natural feature of the landscape, but few have made any suggestions as to how it might be more appreciated by the general public, and thus its destruction made more unthinkable.

The proposal begins by urging the end of all further tin-mining in Templer Park with no further permits being issued. Bukit Takun should then be brought into the Park, with which it is contiguous, so that further threats to its existence will not be possible. The most acceptable use to which it should then be put would be that which benefits the largest number of people, and this means giving it its full recognition as a tourist asset in conjunction with the improvement of Templer Park. This goal can only be achieved by cooperative effort from both the private and government sectors.

The agency or firm which hopes to quarry Bukit Takun could instead consider entering into a tourist-oriented enterprise. This might include a hostel, canteen, bus or taxi service, and guided tours. The committee suggests a cable-car ascent to the back wall of the hill linked to a viewing platform, and with facilities for staying overnight at the summit. All these innovations must of course be constructed so as not to damage or interfere with the general profile, frontal aspect and vegetation of the hill. Such a long-term, non-destructive exploitation of Bukit Takun would both permit the hill's preservation and enhance the many beauties and attractions of Templer Park.

The committee's proposal comprises, in essence, two strong and urgent recommendations. Firstly, limestone areas should be set aside as Natural Monuments or Nature Reserves under fool-proof arrangements whereby the uniquely valuable heritage of these hills may be preserved. At the same time selected hills could be reserved for exploitation, whether by quarrying or otherwise. Private, public and governmental bodies should join in discussion leading to such plans, which should be conceived *in the public interest*.

Secondly there should be a formal systematization of Parks, both National and State; Forest and Game Reserves; Natural Monuments, and other such designations thought desirable to strengthen and ensure the survival of Malaysia's wilderness heritage.

Planters throughout Malaysia will endorse these recommendations, and this Society stands solidly behind all measures that may be taken to save Bukit Takun.

—and from the Editor's post-bag:

"Bukit Takun is irreplaceable scenically and scientifically"

"Bukit Takun blasted down will provide only the lowest grade of crushed rock, unsuitable for cement, fertiliser or marble. Blasting down hills instead of excavating subterranean limestone is cheap and nasty; profitable for the exploiters, ugly for everyone else"

The rewards of rubber research

Another RRIM Planters' Conference has come and gone, but there remains the annual surprise at there being so much development in all branches of natural rubber production that the work of the previous conference is so rapidly superseded.

We are also left wondering whether there is any research establishment, of any discipline, boasting a higher productivity rate than the Rubber Research Institute and its sister organisation, the Natural Rubber Producers' Research Association.

It was appropriate that the conference should be opened by Tuan Haji Abdul Taib bin Mahmud. Both he, and the Ministry of Primary Industries which he heads, are young, and typify the energy being shown by those responsible for the advancement of Malaysia's most vital investment.

Next month we will refer to new developments in the field of natural rubber brought out at this important conference, and we offer our congratulations to the RRIM on completing another year of vital and rewarding research.

Planter, Kuala Lumpur **48:** 171–190 (1972)

ANNOUNCING A NEW MONTHLY SERIES:

CONSERVATION IN MALAYSIA

by

P. R. Wycherley

Dr Wycherley's monograph,* sub-titled *A Manual on the Conservation of Malaysia's Renewable Natural Resources* was the subject of a review in our August 1971 issue. Through the kindness of the author and the special permission of his publishers, we are pleased to announce the monthly serialisation in *The Planter* of the complete Manual, beginning this month.

The main sections are entitled Climate, Soil, Agriculture, Biological Communities, Threatened Species, National Parks and Nature Reserves, and Conclusions. The text has been specially re-edited by the author.

*Published (1969) by the International Union for Conservation of Nature and Natural Resources, Morges, Switzerland, with the assistance of Unesco.

Introduction

Botanists recognise phytogeographic regions, each of which has a characteristic floristic composition, that is, places within a region have many native plants in common, but outside the region many of the native plants are different even if some are found both within the region and in the surrounding area. The Malasian phytogeographic region includes the Malay peninsular south of the Isthmus of Kra, Borneo, the Philippines, the Indonesian islands and New Guinea.

South East Asia is a geographical and political concept comprising not only the Malay peninsular and archipelago outline above, but also the mainland countries of Burma, Thailand, Cambodia, Laos and Vietnam. Sometimes the island of Sri Lanka is included also.

Geographically these countries lie in the equatorial or humid tropic zone between Central Asia and Australia. Politically and economically they are among the developing nations. Nevertheless there is great diversity. Therefore when discussing any problem in South East Asia or the Malasian region, there are broadly two alternatives open, either to treat the whole area in a superficial manner or to deal with one country in greater detail. The latter course has been chosen here.

Malaysia is central to South East Asia as a whole and is typical of the Western sub-region of Malasia. It is a rapidly developing country, opening up its natural resources and making great strides in education and social welfare. It has been selected as an example to discuss conservation problems in South East Asia.

Malaysia is divided by the South China Sea into peninsular West Malaysia, which is the furthermost tip of the Asian mainland, and East Malaysia comprising the two States of Sarawak and Sabah on the northern shore of the island of Borneo. West Malaysia consists of the States of Malaya, which formed previously the Federation of Malaya, and it is more convenient to refer to West Malaysia as Malaya in a largely geographical account of this nature.

Therefore the following usage has been adopted in this account. Malaysia refers to both East and West Malaysia, for instance the east coast of Malaysia means both the east coast of Sabah and the east coast of Malaya (climatically they have much in common). East Malaysia refers to both Sabah and Sarawak. West Malaysia is sometimes referred to as such but more frequently it is simply called Malaya, especially when it is necessary to specify some part, for example the West Malayan Rainfall Region.

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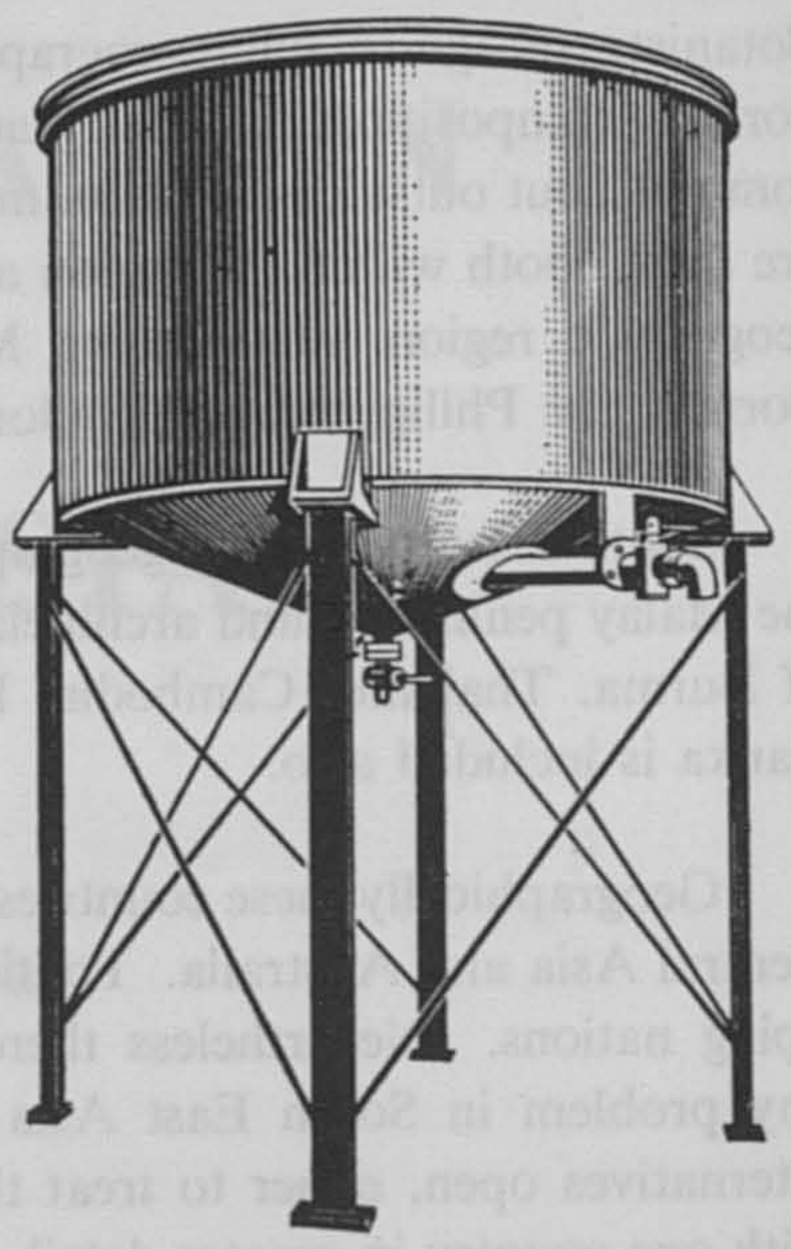

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Climate

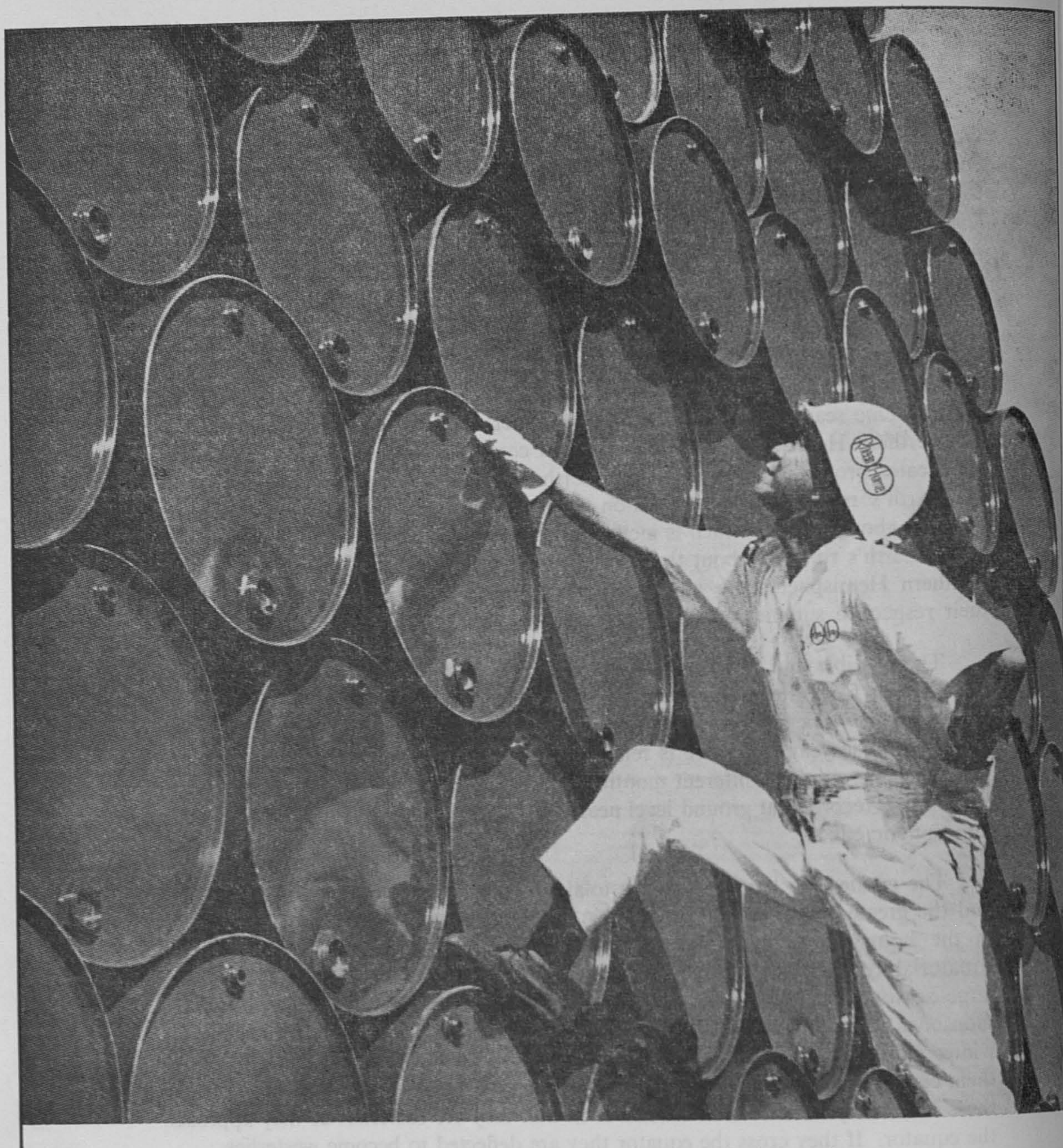
Our planet, Earth, receives radiant energy from the Sun. This is the light which enables us to see by day and the energy which plants convert by photosynthesis into food and fuel. The Earth's surface and atmosphere are warmed by absorption of solar radiation. Energy is lost again and local cooling occurs due to radiation of heat back into space and by such processes as evaporation of water.

The Earth traces an elliptical path around the Sun. The distance between Earth and Sun is least in late December and the total solar radiation intercepted by the planet each day is then at a maximum. Six months later the distance is greatest and the energy intercepted is about 7% less. This variation exaggerates slightly some seasonal differences in the Southern Hemisphere relative to those in the Northern Hemisphere, but this is trivial compared with the differences due to the greater proportion of land in the Northern Hemisphere or the other effects of the Earth's motion. The alternation of night and day results from the Earth spinning about its axis, which is inclined at about 23° from the vertical to the plane of the Earth's rotation about the Sun. Owing to this inclination the Northern and Southern Hemispheres are alternately tilted towards and away from the Sun in their respective summer and winter seasons.

The possible maximum intensity of radiation declines as the angle of the Sun's rays departs from the vertical, whether due to time of day or to change in latitude. These factors work together so that at the equator day and night are equal in length throughout the year and there is relatively little variation in the radiation reaching the atmosphere during different months of the year. Most of the seasonal variation in sunshine recorded at ground level near the equator is due to cloudiness and other atmospheric effects.

The greater the latitude the less total solar radiation received during the year and the greater the seasonal variation in its distribution throughout the year, both in the hours of daylight and its intensity. This greater variation beyond the equatorial region than within it, is an interesting contrast in itself, furthermore large seasonal changes outside the Tropics are a major factor in generating the monsoons which are important rain-bearing winds in South East Asia. During the winter months the oceans and in particular the land masses lose heat, the air above them cools and becomes denser, barometric pressure rises and the air flows outward, these winds acquire a circular motion such that they are easterlies as they approach the equator. If they cross the equator they are deflected to become westerlies.

The weather at a given time and place may be defined as the sum of the ambient physical conditions or the meteorological aspects of the environment. The climate of a place is an appreciation of the weather throughout the year. Some of the components of Malaysia's equatorial climate are significant natural resources in themselves, which arise from the motion of our planet about the source of solar radiation and the effect of this upon distant parts where the winds and rain arise. These are beyond the control of mankind, which is perhaps as well at this stage of human development.



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Sunshine

Hitherto meteorological stations throughout Malaysia have recorded the hours of bright sunshine and from these may be calculated the intensity of solar radiation in calories per square centimetre per day. More recently some stations have installed solarimeters which measure the incoming radiation. The few direct measurements available enable the values for energy calculated from the hours of bright sunshine to be corrected appropriately.

In Malaysia sunshine increases with distance northward from the equator and decreases with distance from the coast and with altitude above sea level. The approximate increase for each degree of latitude is one third of an hour of bright sunshine per day or 11 cals/sq. cm/day. The decline for every ten miles inland in the lowlands is about 8 minutes of bright sunshine or 4 cals/sq. cm/day. The annual means of twenty one stations in the lowlands of Malaysia (based on five years records) were 6.5 hours bright sunshine per day and an estimated 435 cals/sq. cm./day. The lowest annual means were at Kuching: 5.1 hrs and 390 cals. The highest were at Labuan: 7.4 hrs and 460 cals. These are quite high values compared with other parts of the world.

There is a trend of increasing yield of rubber trees from south to north in Malaya, which may be accounted for by the similar variation in solar radiation in conjunction with other factors. The growth of green plants is dependent on photo-synthesis, which requires light energy, and there is a correlation between intensity of solar radiation and yield in many crops. Abundant sunshine is a natural asset, but tempered with the disadvantage that the rate of evaporation from soil, plants or open water such as fish-ponds, padi-fields and reservoirs is largely controlled by the intensity of solar radiation. The rate of evaporation is accordingly high in this region. The maximum benefit in crop yields from plentiful solar energy, whose intensity we cannot control, depends upon the availability of water, a resource whose use can be wisely planned to compensate for evaporation. The energy involved in evaporation is at least sixty and often one hundred or more times that stored by concurrent photosynthesis.

At most places in Malaysia the hours of bright sunshine per day and the estimated intensity of solar radiation follow a similar pattern of variation throughout the year. There is a cycle from a trough of low values somewhere in the period October to January rising to peak sunshine in February to April; the cycle is about two months earlier on the west coast of Malaya than on the east coasts of Malaya and Sabah. The west coast of Sabah is intermediate between these. Western Sarawak is rather exceptional, although the trough is in January, the peak is delayed until July, although fairly high values occur in April and May. There is a tendency in South Malaya towards a minor rise in August or September.

Temperature

The air temperature in the shade is lowest about dawn and rises to a maximum in the early afternoon usually between noon and 3 p.m. The mean temperature can be calculated by adding the minimum and maximum temperatures and dividing

by two or determined by continuous recording throughout the twenty-four hours, and determining the average. The former gives values about 0.6°C (1.1°F) higher than the latter in Malaysia.

If a wide range is examined, for example throughout the whole world, the annual mean temperature is correlated with the annual mean solar radiation or more correctly with the radiation balance. The highest annual mean temperatures in the old world are recorded about latitude 10°N instead of at the equator. The annual mean temperature in the lowlands of Malaysia might be expected to show an increasing trend from south to north in view of this general global pattern and the similar trend of increasing solar radiation from south to north. However, the relationship between the annual means of temperature and radiation is not marked in Malaysia and the tendency towards a south-north trend in mean temperature is obscured by strong local modifying influences. Examples of these are the stabilising effect of winds from off the sea, whose temperature is almost constant at 27°C (80°F), and the disturbing effects of air movements down the sides of the mountain ranges and atmospheric convection currents.

The west coast of Malaya is warmer than the east coast. There is insufficient data at present to generalise concerning Sabah and Sarawak. The highest annual mean temperatures of about 27.3°C (81.9°F) have been recorded inland in the lowlands of Malaya's west coast and on the island of Labuan off the west coast of Borneo. The temperature declines with elevation by approximately 6°C/1000m or 3°F/1000 ft. The lowest temperatures are recorded at the hill stations.

The monthly mean temperature follows a cycle throughout the year similar to that of sunshine, although the temperature peak is on the average two months behind the peak sunshine in Malaysia. The trough in the temperature curve is on the average less than half a month behind the lowest solar radiation at any place. The sunshine curve is symmetrical at Kuching only of the Malaysian stations examined and there the mean temperature curve is in phase with the sunshine curve. At most places in Malaysia the highest mean temperature is in May and the minimum occurs during the period November to January.

The difference between the lowest and the highest monthly mean temperature is between 0.7 and 2.4°C (1.2 and 4.3°F), in Malaysia. There is most variation on some parts of the east coast which are exposed fully to the north east monsoon and at certain central inland stations, but it is least along sheltered coasts. This limited variation indicates how small seasonal differences are in an equatorial climate. This may be contrasted with the difference between the minimum and maximum temperatures during the 24 hours, which is called the diurnal range. The annual mean diurnal temperature range varies between 5.2 and 11.2°C (9.4 and 20.1°F).

The diurnal temperature range is closely correlated with the concurrent sunshine at any place. When conditions favour strong solar radiation inward during the day, there is probably high reverse radiation outward at night. Thus the daily warming and cooling is more pronounced during sunny periods and the temperature accordingly fluctuates more markedly. This accounts for the variation in diurnal temperature range throughout the year at each place; however the variation from

place to place is not related to the mean solar radiation. The annual mean diurnal range is usually least close to the coast and the stabilising influence of the sea. Variation increases with distance inland in the lowlands, although some of the cooler hill stations are less variable.

The maximum temperature attained by day follows more closely the sunshine cycle through the year. The peaks and troughs in the maximum temperature lag on the average about one month behind those for sunshine. Since strong radiation induces greater diurnal temperature changes, the minimum to which the temperature falls each night before dawn does not mount as rapidly as the maximum day temperatures during the period of increasing solar radiation. The minimum or dawn temperature curve lags about a month behind that for the maximum or noon temperature. In most of Malaysia the peak and trough for sunshine occur respectively in March and November—December; those for maximum day temperatures are in April and December, those for minimum or dawn temperatures are in May and December-January, and those for the mean temperatures are in May and December.

Hot afternoons are usually too warm for comfortable work, whereas in the cool hours before sunrise some covering is necessary to prevent chilling of the inactive sleepers. It has recently been suggested that the effective temperature, which takes into account air movement and relative humidity as well as the air temperature, is a good index of comfort. The effective temperature is usually lowest at dawn, rises to a peak at noon or shortly afterwards and then falls to a low value by about an hour after sunset which is followed by a minor rise during the night before dropping to the minimum again before dawn. The mean effective temperature shows a similar pattern of variation throughout the year at most places in Malaysia, usually it is lowest in January and highest in May. The effective temperature declines with altitude and the hill stations are too chilly unless warm clothing is worn. In the lowlands the average effective temperature increases with distance from the coast, which is in accord with experience that small hills exposed to sea breezes are pleasantly cool and comfortable sites.

Relative Humidity

Except for the unstable condition known as super-saturation, the air can only contain a certain amount of moisture. This quantity of water vapour increases with temperature. Excess water condenses as dew or mist especially when the temperature falls. The relative humidity is the amount of water present expressed as a percentage of that which would saturate the air for the ambient temperature, *i.e.* the relative humidity of saturated air is 100%.

The relative humidity usually attains a high value close to saturation after sundown and maintains this during the night, reaching a maximum just before dawn. The average maximum relative humidity of the air varies from 94 to virtually 100% in Malaysia. There is a tendency for the average maximum to be greater at places where there is a greater diurnal range in temperature.

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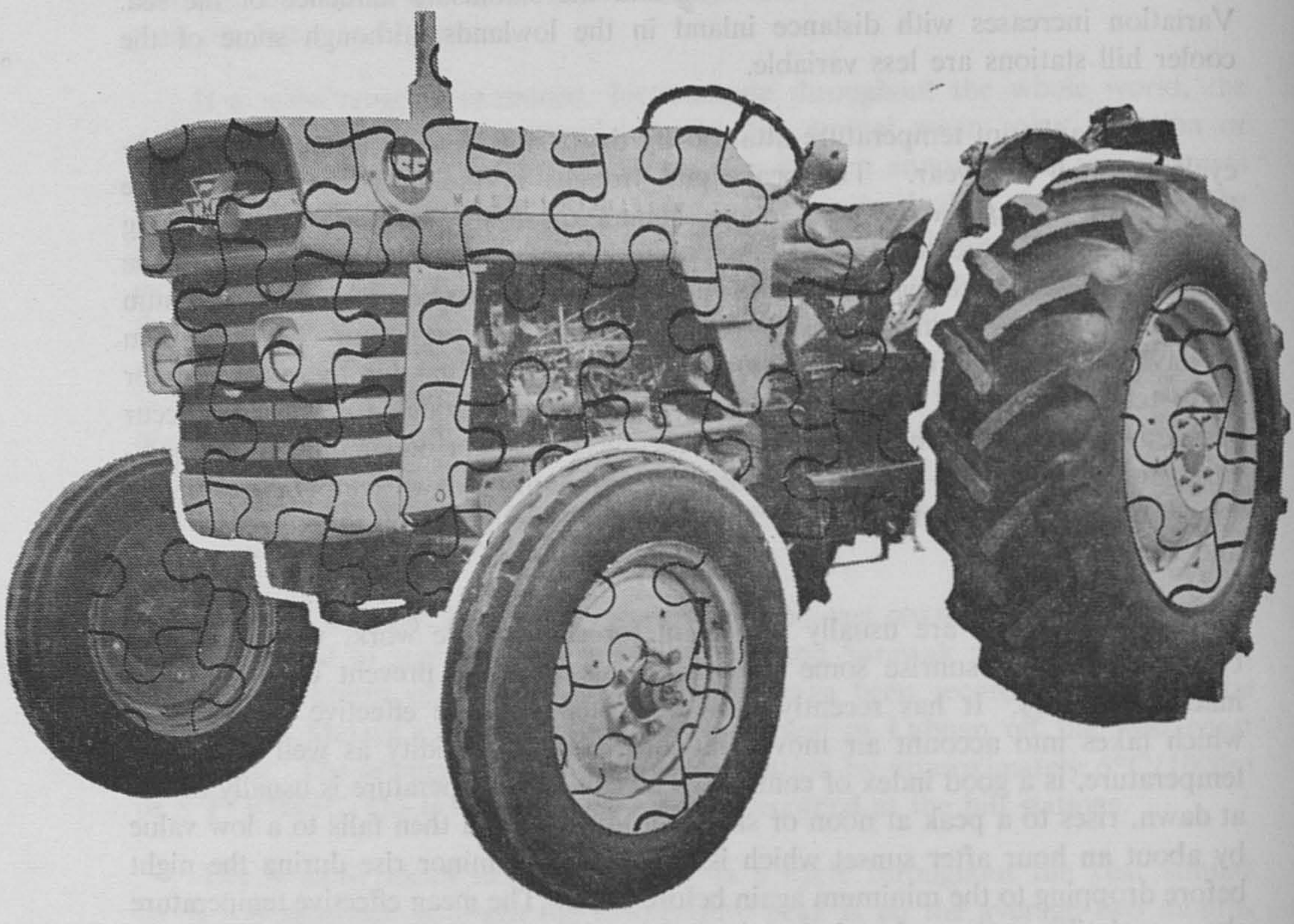

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As the air is warmed after sunrise so the relative humidity drops to reach a minimum at the hottest time of day. The drop in humidity is closely related to the amount of the temperature rise, that is the diurnal temperature range, both from place to place in Malaysia and from month to month throughout the year. Often the fall in humidity during the day is approximately equal to that predicted from warming saturated air at the minimum night temperature to the maximum day temperature. However, usually the minimum relative humidity is higher than this predicted value because of evaporation of moisture from soil and water and transpiration of plants. Also rain temporarily increases the humidity preventing a fall to the predicted minimum. In the Malaysian region the relative humidity falls lower than the minimum predicted from the diurnal temperature range rather infrequently during dry spells, when reserves of moisture for evaporation have been reduced.

If the relative humidity over the 24 hours is averaged, the mean relative humidity is obtained, which is intermediate between saturation and the minimum attained by day. During rainy seasons the average humidity tends to rise. In the lowlands the monthly mean minimum relative humidity ranges from 45 to 85%, the annual mean minimum relative humidity falls within a narrower bracket of 60 to 75%. The average relative humidity has a range in monthly means of 70–90% and the bracket for annual means is 80–88%. The corresponding figures at hill stations are all higher. The intermediate hill stations in the cloud belt at about 4 000 ft are the dampest.

The humidity is higher in the shade of forest trees and many delicate plants and animals cannot stand desiccation. Most mosses and ferns are confined to forest conditions or to the cloudy hills. Examples of such habitats must be preserved if the full range of plant life is to survive. There are more immediate applied reasons for studying variations in relative humidity and associated phenomena. Parasitic fungi are often susceptible to dry conditions, especially during their stages of dispersal and invasion of new hosts. Many require critical minimum periods of near saturation or even actual dew formation in order to infect a plant. In some crops it is possible to apply plant protective measures at the most opportune moment to prevent disease by predicting through meteorological observation when the fungus would otherwise attack.

Dew and Mist

As moist air cools, its relative humidity rises until it reaches saturation; if further cooling takes place there will be excess water in the air. If the excess remains in the vapour state, the air is supersaturated, but this is an unstable and therefore usually a temporary condition. The excess moisture condenses into water droplets. Condensation on soil, plant or other surfaces is called dew. Condensation as fine suspended droplets is called mist, which forms more readily if there are fine particles of dust or similar nuclei for condensation floating in the air. Dew is probably more common than mist, partly because mist formation may be retarded for lack of nuclei, but mainly because solid bodies radiate heat more rapidly so the air in contact with them is cooled more.

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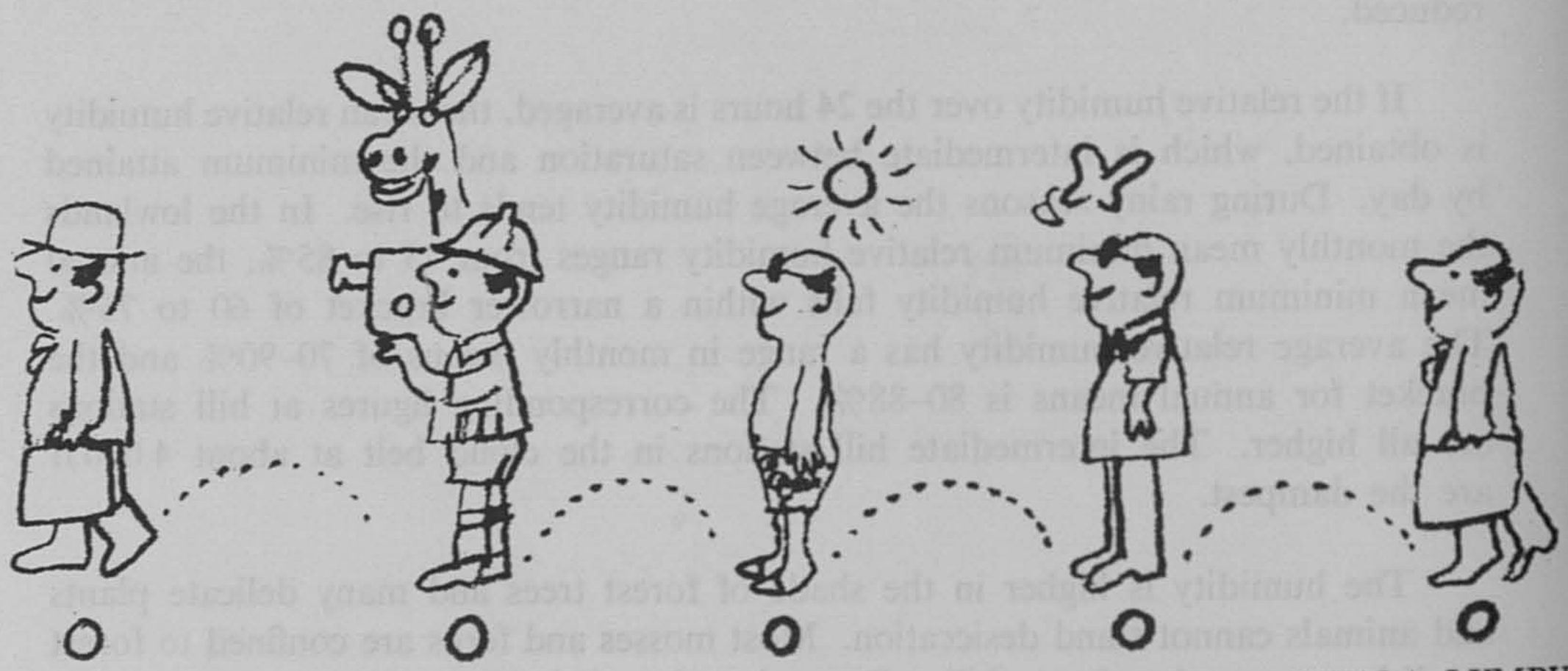

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Dew formation is not regularly recorded at most meteorological stations in Malaysia, but some data on mist have been collected because of its important effect on visibility for navigation of aircraft and shipping.

The number of times mist is recorded during the year is greater in places where the average maximum relative humidity is higher, which is not unexpected. Mist is most common in places where the relative humidity does not fall by day as much as predicted by the temperature range, or in other words where rain and evaporation increase the moisture content of the air so that it is over-saturated at night temperatures.

Mist-free places are known on both east and west coasts of Malaysia and even one place inland, namely Ipoh. Despite these exceptional places, there is a general pattern of fewest mist days on the west coasts, twice to three times as many on the corresponding east coasts, and about ten times as many inland as near the coast. Mistiness increases as the hills are ascended to the cloud belt, above which on the highest hills there is some decline in the number of mist days.

Correlations between the number of mist days per month and the corresponding monthly mean maximum relative humidity, and with the excess humidity above that predicted from the monthly mean diurnal temperature range, are found in several places, but not at all the stations investigated.

The distribution of mist days throughout the year is rather erratic and it is not possible to give any simple generalisation. Dew formation is probably under similar conditions as mist but more frequent. The amount of dew precipitated is not known, but it is probably trivial compared with the large amounts of water needed to meet the demands of evaporation and transpiration.

Evaporation

The change of state of liquid water to water vapour is called evaporation. This change requires a considerable amount of heat energy, about six times as much energy as that required to raise the temperature from freezing point to boiling point without change of state at atmospheric pressure. Whenever water is in contact with air which is not saturated, evaporation will take place provided there is adequate energy available. There is abundant solar radiation in a tropical climate, the warmth of the sunshine is self evident, and the air is not saturated by day as the relative humidity figures demonstrate. Thus from every water surface, whether a lake, damp soil or the tissues of a plant, evaporation takes place.

Land plants must obtain carbon dioxide from the air in order to make carbohydrates by photosynthesis, therefore they must expose tissues to the air during periods of sunshine in order to assimilate, metabolise and grow. It follows that inevitably they must lose water from these exposed tissues by evaporation or transpiration as it is called in plants, even if the dissolved substances in plant juices reduce the rate of evaporation. Some plants have devices such as closure of the leaf pores to prevent loss of water under severe conditions, but this reduces carbon dioxide supply and photosynthesis. The utilisation of the light energy abundant

in the tropics to make plant products, including timber and the food of man, animals and the plants themselves, depends on provision of adequate water to balance the losses by transpiration. This is especially true of most crop plants, which have a high water demand, and in particular of wet padi because water evaporates from the rice fields as well as transpiring from the plants. One or more (often several) tons of water are required to enable one pound of food, timber, clothing, industrial or agricultural produce to be obtained.

The rate of evaporation from free water surfaces such as reservoirs has been determined under various conditions. This has been correlated with the losses from pans of specified construction, which provide a convenient means of routine meteorological observation. Such results have been related to other meteorological phenomena such as solar radiation, temperature, relative humidity or saturation deficit, and wind speed, thus it is possible to calculate the potential evaporation from such meteorological records where direct observations on evaporation are not available. Evaporation is very closely correlated with the solar radiation balance, in general the longer the hours of bright sunshine are in Malaysia the greater is the potential evaporation. Evaporation is also correlated with the saturation deficit, (the deficit in water vapour pressure required to saturate the air). Wind movements enhance evaporation by circulating the air.

The rate of transpiration by various crop plants has been investigated. It is found that a complete cover of vegetation with several leafy layers such as a forest can transpire as much water as would evaporate from a free water surface such as a lake of the same area. Mature rubber trees and oil palms probably transpire as much as the theoretical maximum potential evaporation and similar amounts evaporate from padi fields. The actual evaporation is limited by the water available and during periods of drought is less than the potential.

There are relatively few records of evaporation from reservoirs, pans or catchment area studies in Malaysia. These have been supplemented by calculations from other meteorological data. Calculated values may not appear as reliable as actual observations, but since minor variations in the technique of operating evaporation pans can cause considerable differences, and there is nonetheless reasonable agreement between the calculations and observations, all these results can be pooled to give a fair estimate of the degree of potential evaporation.

Evaporation is expressed in the same way as precipitation as the depth of water in inches per month or millimetres per day. The range in observed values is from 3.5 to 7.7 in. per month (2.9 to 6.5 mm per day) and the range in annual means from 51 to 78 in. per year (3.6 to 5.5 mm per day) at various places. Calculated monthly values range from 4.0 to 7.8 in. per month (3.4 to 6.6 mm per day) and calculated annual means vary at different locations from 62 to 79 in. per year (4.3 to 5.5 mm per day). These are relatively large figures compared with the precipitation; indeed pilot catchment studies indicate that from one half to two thirds of the actual rainfall is evaporated (including transpiration), and never reaches rivers, reservoirs or the sea.

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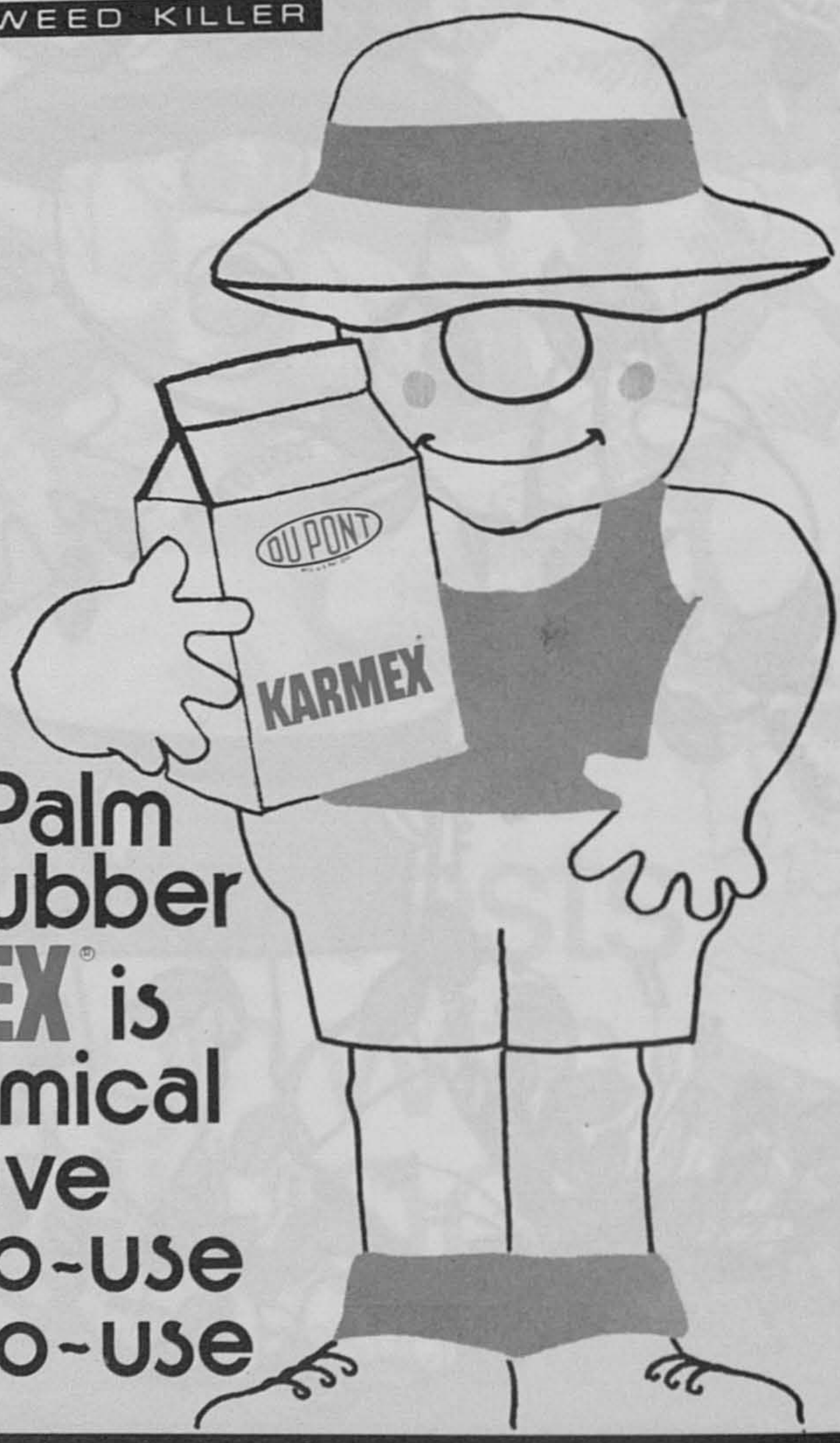

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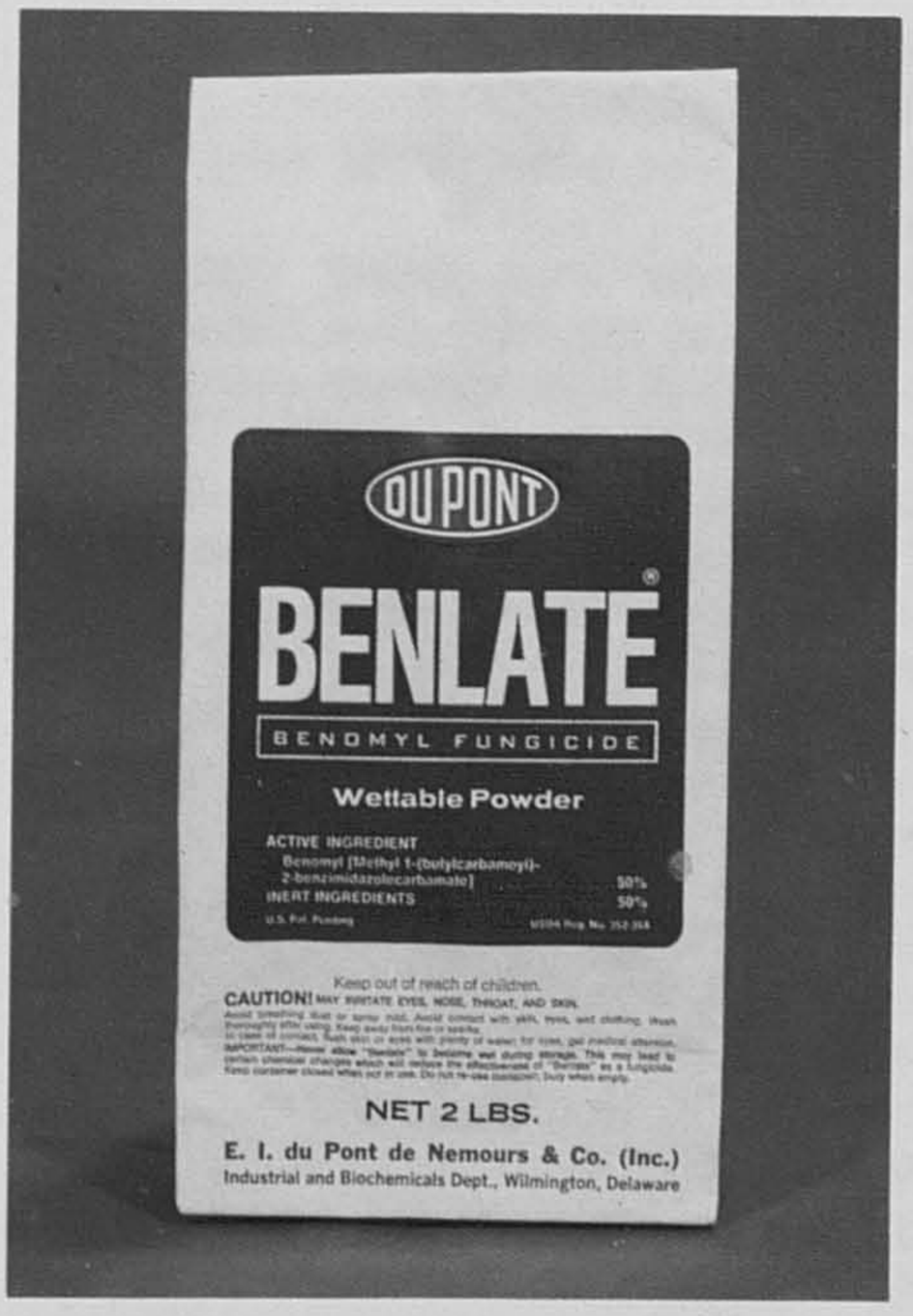

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WHEN TO APPLY:

Begin application when disease first appears on the tapping panel and repeat treatment at 7 day intervals as long as needed. Spot treatment may be necessary in case of re-infection.

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Apply Lannate® as a spray at the rate of 4 oz. per 80 imp. gallons of water (6 grams in 4 gallons) and add a wetting agent at the manufacturer's recommended rate. Use a conical nozzle and adjust the spray until coarse. Use a high pressure to obtain good penetration into the bunches and spray to run-off.

WHEN TO APPLY:

Begin application when the first signs of insect attack are apparent on the bunches. Repeat at 14 day intervals as long as needed.

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Southern Malaya. Commencing in May the southerly monsoon continues until August, bringing rain to the west coast of Sabah, but only to parts of the Malayan west coast owing to screening in places by Sumatra.

The reverse exposure of the east and west coasts to these Monsoons, especially the east coasts lying open to the powerful North East monsoon, is largely responsible for the difference of up to two months in the sunshine, temperature and dependent meteorological cycles on the opposite coasts. The major differences in the seasonal distribution of rainfall are largely, but not entirely, due to the monsoons.

The transitional periods occur between monsoons about the equinoxes and for some weeks later. The first transitional period is late March, April and part of May. The second starts in September and continues until November.

Apart from the monsoons, which are persistent prevailing winds, there are more local and frequently changing phenomena. The 'sea' and 'land' breezes experienced on the coasts are due to the differential warming and cooling of sea and land, 'sea' breezes blow from sea to land by day and the 'land' breezes in the reverse direction at night. Day squalls arise on the east coasts and night squalls strike the west coasts, especially across the southern Malacca Straits as 'Sumatras'. Advection currents associated with convection currents, thunderstorms and instability rain are common during the afternoons during the equinoctial transition periods between monsoons in the inland districts. Cold air rolls down off the mountain ranges to raise an evening breeze in foothill areas.

Types of Rainfall

When the wind crosses the sea it gathers moisture and if the air is forced to raise by mountains, the cooling causes precipitation of rain. This is called *orographic* rain from *oros* the Greek for a mountain. In Malaysia the small rise on crossing a low coastline is enough to precipitate heavy rain from the air laden with moisture after passing over the warm seas. Hence the heavy rain in districts exposed to the monsoons. Even so the rainfall increases over the foothills and mountains further inland from the coast.

Boundary rain occurs where two air streams converge and force each other upward, as over Malacca during the South West Monsoon period. Boundary rain also occurs when a moisture laden wind presses against a relatively static body of air, for example over Western Sarawak when the North East Monsoon plays itself out against the Doldrums then resting about and below the equator. Thus boundary rain is largely associated with the strong monsoon winds, although the mechanism of precipitation is somewhat different from the orographic.

Instability rain is the commonest form in many parts of Malaysia during much of the year. The sun heats up the land and convection currents rise, which eventually force up rain-bearing clouds into colder air where precipitation occurs. Convection currents arise from relatively warm places and the ground is cooled where the rain falls, thus a mosaic of temperature and pressure changes occur which are rapidly brought into equilibrium by fairly strong local wind and rain storms. Such rain is

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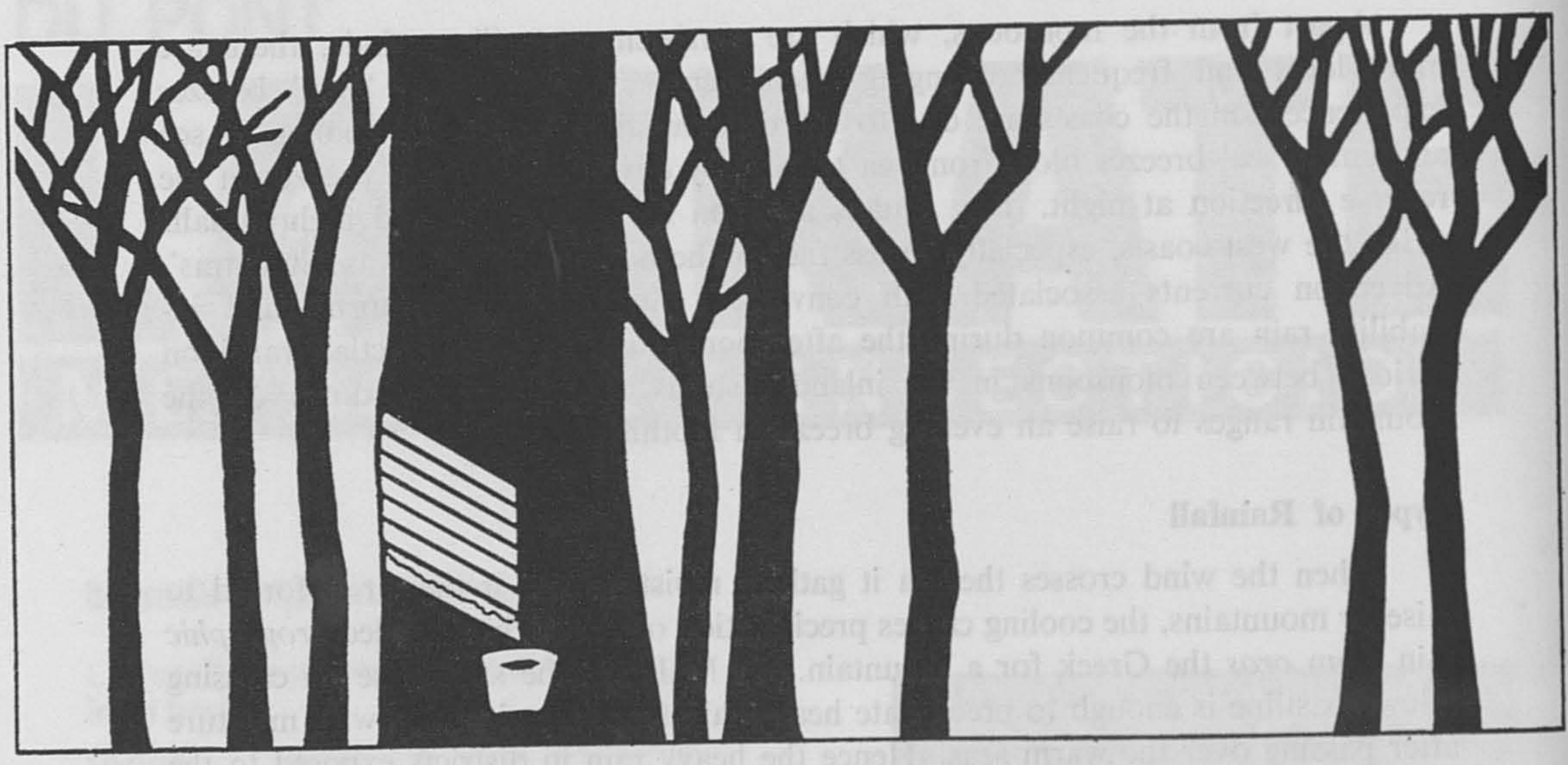

(extracts from a crop protection paper.)

" Black stripe: — effective fungicides were captafol (2% Difolatan), —. Complete control of the disease seldom occurred and a maximum 65% reduction in severity was the best that could be achieved with severe infection.

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most common during the transition periods between monsoons just after the equinoxes.

Seasonal Distribution of Rain and Rainfall Regions

The country may be divided up into regions, each with a characteristic seasonal pattern of rainfall distribution. East Malaya and East Sabah are similar in receiving heavy rain during the North East Monsoon and light to moderate rain during the rest of the year. Western Sarawak also receives most rain during the North East Monsoon, but rainfall is quite heavy throughout the rest of the year too.

North West Malaya from Kulim northward and the West Coast of Sabah agree in having low rainfall during the North East Monsoon; both are protected by mountain ranges to their east. Rain falls during the transitions and South West Monsoon in varying amounts. A rather small area around Malacca also has its lowest rainfall during the North East Monsoon, the dry spell sometimes extending almost until the South West Monsoon begins.

The greater part of Malaya lies in the West Malaya rainfall region with heavy rain during the latter parts of both transition periods and fair amounts during the beginning of the North East Monsoon. The remainder of Sarawak or the Central Region has a somewhat similar pattern, although the rainfall is high during the rest of the year compared with other places.

The Interior and South East Regions of Sabah are areas of relatively low rainfall and little seasonal variation compared with the rest of Malaysia. They are distinguished from each other by the Interior usually having somewhat more rain after the first equinox than during the second transition period, whereas in the South East the latter period has the most rain. The usual annual rainfall in the Interior, which is a plateau surrounded by mountains is 60–75 in. (4.2–5.5 mm/day) and in the South East at the upper limit of this range.

Such relatively low annual rainfall in the bracket 70–80 in. (4.9–5.6 mm/day) is known in Malaya on the west coast around Kuala Selangor and Sitiawan and inland also in the West Malaya Rainfall Region round Kuala Pilah and Lenggong. Although dry spells are quite frequent in these areas of low annual rainfall, the most severe dry spells are experienced in the North West Region Region of Malaya, at Kangar for instance there is no rain at all during January about one year in eight. Dry spells in Malaysia are much less severe and far shorter than conditions prevailing in the arid regions of the world where there may be hardly any rain at all for years.

The whole of Sarawak has consistently heavy rainfall; with only a few local exceptions the annual means are over 120 in. (8.4 mm/day) and the annual rainfall is over 150 in. (10.5 mm/day) for more than half the records. The rainfall at Matang usually exceeds 170 in. per annum (12 mm/day). South West Sabah around Beaufort also has high annual rainfall about 150 in. (10.5 mm/day). There is another area of fairly high annual rainfall (120 in./year or 8.4 mm/day) on the East Coast of Sabah around Beluran and Sandakan.

In Malaya the east coast is somewhat wetter than the west coast owing to the greater exposure to the North East Monsoon. Rainfall increases further inland on ascending into the hills. The annual rainfall throughout the East Malaya Rainfall Region is in excess of 100 in. (7 mm/day) and in the hills of the East Range, especially on the seaward side, rises to 160 in. (11.2 mm/day). Along the western coast of Malaya the annual rainfall is below 100 in. (7 mm/day) and markedly less in places, but increasing inland so that the hills have as high a rainfall as those on the east coast. The Larut hills in the neighbourhood of Taiping receive average annual rainfall up to 230 in. (16.2 mm/day).

Intensity of Rainfall

The most intense rainstorm recorded in Malaya was 2 in. (51 mm) in 15 mins at Kuala Lumpur; this was an extreme example of the relatively brief but heavy precipitation commonly occurring as instability rain. In places exposed to the monsoons, especially the East Coasts during the North East Monsoon, rain may continue for five days at an average intensity of about 0.1 in./hour (61 mm/day) or 12 in. total (305 mm).

On the East Coast of Malaya precipitation in excess of 32 in. (810 mm) may be expected during November or December about once every three to five years. Once every ten years more than 10 in. (254 mm) may be expected to fall within 24 hours at East Coast Stations, indeed in places once every five years. This precipitation is most heavy on the seaward side of the East Mountain Range and the run-off must make its way across a relatively narrow (upto 30 miles wide) but almost flat coastal plain. The greatest precipitation within 24 hours was 24.0 in. (610 mm) near Kuantan. Heavier downpours of such durations are believed possible.

In the Matang hill area near Kuching in Sarawak, the precipitation in January exceeds 32 in. (810 mm) one year in two and exceeds 64 in. (1 620 mm) once every fifteen years. At Kuching itself more than once in every four years the rainfall exceeds 32 in. and exceeds 64 in. once every thirty. Therefore it is hardly surprising that floods occur periodically; it is surprising that they are not more frequent or disastrous.

The landscape is moulded by the environment and after a period of centuries becomes stabilised and adjusted to the average physical conditions. This is largely a living process in which the natural vegetation plays a dominant role. Such a natural landscape can absorb the shocks of all except the most extreme storms of wind and rain. Even when some catastrophe strikes the worst wounds are soon healed although some signs of disturbance can still be seen. When a landscape has been modified by human activity, felling, clearing, burning, over-grazing, cultivation or subsequent abandonment, it may lose both its capacity to withstand extreme conditions and the resilience to recover.

Floods

During January and February 1963 more than twice the usual precipitation was experienced throughout East Malaysia, as much as 147 in. (3 740 mm) fell at

Semantan in Sarawak. Deep floods were widespread. The years of serious floods in Malaya were 1897, 1926/7, 1966/7 and 1970/1. The assessment of the most recent floods is still in progress, but there is some circumstantial evidence, such as the maximum height the river reached at Kuala Kangsar and how rapidly the waters rose, that successive floods have been more dangerous and damaging. If so, this could be related to neglect of soil, water and river bank conservation measures, and to the increasing areas which have been disturbed by human activity. As the country develops, more public works and private property are at risk, therefore protection becomes an increasingly important investment as insurance.

The silting up of the lower reaches of the Kinta River, a tributary of the Perak River, as a result of tin mining further up the Kinta Valley, has caused frequent flooding in both the lower and middle reaches about Teluk Anson and Ipoh. Heavy rain is unable to escape rapidly to the sea because the river bed has been raised by silt and so the waters readily over-flow the banks and flood the country-side. The Batang Padang River in the same area became silted from mines near Tapah; the river changed its course and flooded large areas, converting them into inaccessible swamps until reclaimed by the Manik River irrigation scheme. The inability of flat alluvial plains and of steep hill slopes to cope with the heavy downpours after human interference with the landscape, has been tragically demonstrated when a mining dam broke at Cheras in 1963 and a massive landslip occurred at Ringlet, Cameron Highlands, in 1961.

Periodically intense or prolonged downpours will occur; these cannot be prevented at present, but the results can be ameliorated by good land use, soil and water conservation. Over-exploitation of the land and neglect of conservation measures have led to loss of life, property and land.

The Hydrological Cycle

In the preceding sections rainfall and evaporation have been described and mention made of flooding resulting from impeded river flow. These are all aspects of the hydrological cycle, which is an account of how water, an essential for life, circulates on our planet. The rain falls on land and sea and returns to the atmosphere by evaporation. Only the fate of rain falling on the land will be considered here. Minor forms of precipitation such as dew and hail follow a similar course.

Rain may fall directly onto the soil surface or be intercepted by plants. Intercepted water may be absorbed by the plant, usually to be almost immediately evaporated by transpiration in this climate, or it may drip off the foliage or trickle down the stems to the ground. Raindrops vary in size according to the manner of their formation and the degree of saturation of the atmosphere they have travelled through; in Malaysia's humid conditions raindrops are often rather large. The diameter may be 0.5 to 3 mm which would hit the surface at a speed of 9 to 20 mph (4 to 9 m/sec) respectively. The actual energy involved depends on various factors, but many thousands of droplets fall on a square yard or metre of land during an hour of quite light rain. This energy must be absorbed in some way. If the rain strikes a bare soil surface, much of the energy will be used in dislodging

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particles, weathering and eroding the soil. With a cover of vegetation the force of the rain displaces and even damages the foliage, although the resilient nature of the leaves and branches can tolerate much damage, and moreover the plants can replace damaged leaves.

When precipitation reaches the soil surface, whether directly or after interception by vegetation, it may either infiltrate into the soil or run off over the surface. If the soil is already saturated with water, the rain cannot infiltrate but must run off. The rate at which rain infiltrates the soil depends on physical conditions at and near the soil surface, on the degree to which the soil is already saturated and how freely water can drain away. The water which infiltrates replenishes the soil water reserves available to plants, and that which infiltrates in excess of immediate requirements and of the soil water storage capacity percolates through the soil until it appears in streams or is impounded in deep underground water reserves. Percolation into streams and hence gathering of the water into lakes and rivers, which eventually discharge into the sea, is more usual in Malaysia. Deep water reserves, such as are tapped by artesian wells in other countries, are comparatively rare in this country.

The water which runs off directly over the soil surface after reaching the ground also makes its way into streams, lakes, rivers and the sea. However, this direct surface run-off causes erosion and carries off soil material into the streams and rivers to an extent determined by the topography of the land, soil characteristics and the degree of interference with natural conditions. If there is a cover of vegetation rapid run-off is impeded, the eroding effects are reduced and some of the particles are deposited again on the surface, mixed with plant material and not lost to the soil. Vegetation affects the balance between infiltration and surface run-off in various ways. The plant litter on the soil surface forms a filter which removes fine debris and prevents it from clogging the narrow channels through the soil, organic matter improves soil structure so keeping these channels open. The transpiration demands of the plants often bring the soil water content below saturation, but in turn the humus or organic matter added by the vegetation to the soil increases its water storage capacity. Although transpiration may reduce the amount of water reaching streams, vegetation controls loss of soil by erosion and keeps the water free from an over-burden of silt. Streams laden with silt lead to flooding down river as described in an earlier section, or if the silt is trapped in reservoirs for hydro-electric power, urban water or irrigation supplies, the life of these expensive installations is severely curtailed.

If more water is obtained in the streams and rivers by destruction of the surrounding vegetation, not only is this water dirty, needing costly treatment to render it usable, but its release is erratic, following closely the original pattern of rainfall, drought and storm. Vegetation enables the catchment area to act like a sponge taking up water and releasing it more slowly, smoothing the extremes of discharge rate. This was demonstrated by preliminary studies in central South Johore. The flow of water in the streams during dry periods was lower the greater the proportion of the catchment that had been cleared of forest.

The limited investigations made so far suggest that when rubber trees have established a complete canopy, the rate of run-off differs little from that for similar

areas with natural forest, provided the steeper slopes have been terraced. The proportion of precipitation (a) which runs off directly over the surface and (b) which eventually contributes to stream flow, including immediate run-off, can be determined by prolonged careful measurements in catchment areas. Few such studies have yet been made in Malaysia, but considering these results in conjunction with the measured or calculated evaporation, the following estimates may be made.

In low rainfall areas such as parts of the Selangor and Perak coast and the sheltered inland part of Negri Sembilan, the interior and south east of Sabah, there is probably very little run off or local contribution to stream flow, because evaporation accounts for most of the precipitation; these areas can be irrigated by rivers which rise in mountains elsewhere.

In intermediate conditions of 90–100 in. (230–250 mm) rainfall per annum fairly equitably distributed, about one third to one half probably reaches the rivers from catchment areas with continuous tree cover. Perhaps one tenth of the rainfall contributes to direct surface run off.

In regions of seasonal rainfall, especially monsoons, the soil in the affected areas will soon be saturated during the rains and in these months 75–90% will run off directly into streams. During the rest of the year conditions will approximate to one of the previous categories.

At continuously wet places such as Kuching at least half the precipitation almost certainly runs off directly during all seasons.

The hydrological cycle is completed by evaporation of water back to the atmosphere. This may be by transpiration of plants growing in the area where the rain fell, or which received the water by rivers or irrigation streams. Water may evaporate directly from the soil, but this is usually relatively little, more is lost from extensive water surfaces such as lakes, reservoirs, rice fields and finally the sea itself.

Water and River Conservation

Several measures to conserve water have already been indicated, moreover soil and water conservation are very closely related, yet these aspects are so important that repetition of some of the foregoing here and under soil conservation needs no apology. At the national level the upper and steeper slopes of the hills should be kept under protective forest, whether they are catchment areas for public utilities or the headwaters of rivers, so that large fluctuations in flow are dampened and burdening of the water with silt is prevented, thereby reducing risk of floods and low water alternating downstream. Excessively low water prevents navigation, often depletes stocking with fish and leaves no surplus for irrigation. The hills are not the only source of water or of silt in the rivers, which are fed by the surrounding land along their course to the sea. The river banks themselves are constantly being eroded and the resultant silt deposited in slack water on bends (meanders) and further downstream especially in esturine flats, which slowly claim land from the sea. Thus some erosion is inevitable and can serve a useful purpose provided it is

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under control. If the river is alternately in spate, when the scouring by the torrent and its over-burden will be greatest, and then in low water when the banks will dry out and crack, there will be a rapid breakdown of the banks. Therefore the first measure towards protection of the river banks is to promote a stable water regime by maintaining the catchment under forest.

There is no doubt that the benefits of a vegetational cover in the catchment areas far outweigh any disadvantages under Malaysian conditions or indeed in most regions of the world. The deleterious effects of exposed or disturbed soil can be disastrous, both by losing soil by erosion and by depositing it where it is not wanted either in reservoirs or in rivers where it may cause flooding. It is unwise to clear large contiguous areas on the upper steeper hill slopes, since calamity may strike during the comparatively short periods before the cultivated crops can cover the soil. Short rotation crops which expose the soil repeatedly are particularly undesirable. Undisturbed natural forest is the best protection in these areas and it is planned to retain about one fifth of Malaya's land area, namely that above 1 000 ft a.m.s.l. (approximately 300 m), as protective forest for this purpose. This resolution should not be weakened, and it seems desirable to observe the stricter rule not to alienate for agriculture land above the 'steep land line', a relatively distinct contour where a marked inflection in the slope of most Malayan hills occurs, although its elevation varies from 150 ft (45 m) in Kedah to 750 ft (225 m) in North Pahang.

The fertile valley bottoms and flat coastal strips are those most suited to intensive market gardening, padi production and other crops requiring regular cultivation of the soil. These must be protected from flooding by wise management of the catchments areas above, which can also provide water for irrigation in those areas where dry spells are likely. In the intermediate areas tree and palm plantations are probably best.

Strips of natural vegetation should be retained on river banks, so that the roots will bind the soil. In most states of Malaya there is legislation to this effect, but it is hardly ever observed or enforced. A fringe of trees along the river banks would help to prevent logs left after felling the forest from being lifted up and swept away by flood waters. Occasional floods are inevitable, but far more damage is done to public works such as bridges, when a great weight of timber crushes against their piers and then lifts beneath the spans on the rising water or forces water downward to scour away the river bed from the foundations because it cannot penetrate or overflow the barrier of matted vegetation. Much damage of this nature might have been spared during the recent floods, if this legislation had been observed in large-scale land clearing operations. The Drainage and Irrigation Department endeavours to prevent this damage by the construction of artificial control measures and the re-establishment of natural or other suitable vegetation along the banks.

The law forbids mines specifically from dumping excessive silt in the rivers, and more obscurely prohibits any pollution of waterways. Organic matter from soil, factory or domestic wastes uses up the oxygen in the water so that fish are suffocated and bacteria may proliferate. Miners have found ways of evading the silt clauses and many others are ignorant of the law or disregard it.

WHY YOUR CROPS NEED SUL-PO-MAG

NUTRIENT REMOVAL CHART
Pounds of nutrient per acre used by various crops

	Nitrogen	Phos-phate	Potash	Mg.	Sulphur
Banana plants/ acre (1200)	400	400	1500	156	*
Coffee lbs/acre (1784)	27	4	43	61	16
Oil Palm lbs/acre (13382)	80	18	120	18	*
Pineapple plants/acre (15000)	134	170	535	53	*
Corn bu/acre (100)	150	60	125	33	22
Tobacco lbs/acre (2000)	75	15	120	18	14
Grain Sorghum lbs/acre (8000)	260	110	220	36	38
Rice lbs/acre (6500)	135	51	18	15	18

*No information

The Sul-Po-Mag nutrients

(nature's natural combination of magnesium, potash and sulphur)

While most farmers are familiar with the needs for nitrogen, phosphate and potash, they are sometimes surprised to learn how important other nutrients can be in the diet of a growing plant.

Magnesium and sulphur often deserve special consideration. As the chart above shows, some crops need *more* sulphur than phosphate and some crops need more magnesium than nitrogen. All crops need both sulphur and magnesium and if these needs cannot be provided by your soil, crop yields and quality can be seriously reduced. Here's why:

Stimulates Growth

Proper magnesium balance stimulates growth. If a plant is deprived of magnesium, all growth processes will be slowed, and the plant will be unable to produce high yields.

Improves Quality

The addition of sulphur can improve the quality of crops. Without sulphur, proteins cannot be formed, thus, crop quality can suffer.

Deficiencies are Widespread

Magnesium and sulphur deficiencies have been observed in every major crop and in most crop-production sections of the world. And in many cases Sul-Po-Mag has been used to help correct these deficiencies.

Use Sul-Po-Mag

Sul-Po-Mag is a natural combination of available magnesium, sulphur and potassium, and it is essentially chlorine free. Although it is 100% soluble, Sul-Po-Mag does not leach out even in sandy soil. This means the nutrients are available for plants throughout the growing season. It can be mixed with your regular fertilizer or it can be applied directly to the soil. Sul-Po-Mag will not affect the soil pH.

Please check with your local IMC Representative about the best methods of application and proper application rates for your area.

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BEHN MEYER & CO., LTD.

Agent:
GUTHRIE WAUGH LTD.

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In the cultivated undulating lowlands the object is to retain as much soil on the land and to store as much water in the soil as possible without actual water logging. As always a vegetational cover plays a useful role by breaking the force of the rain and adding to the organic matter in the soil. Tree, palm and other permanent or long rotation crops provide good cover and expose the soil least. Even so since there are several years before rubber trees or oil palms cover the whole ground area, it is good practice to plant a 'cover crop' of creeping legumes or to manage the weeds or grasses between the rows of trees as a protective cover. On the steeper slopes the rows of trees should follow the contours and be prepared as terraces with marginal bunds. The rows are usually ten yards or metres apart, so this is the maximum distance rain water trickles before reaching a terrace, where it can soak into the soil. Thus swift flowing streams, which would erode the soil and run the water off the land too quickly, do not develop. Sometimes additional contour ditches or silt pits are necessary.

Weeds in the rows compete with the trees and it is customary to control these. In the past this was done by hoeing with a changkol and the cultivation of the soil was supposed to reduce evaporation from the soil and increase infiltration. More recent investigations suggest that puddling of the soil and clogging of its interstices may result from the pulverising of soil by the action of such tillage and exposure to the sun and rain. It is probably better to control weeds by spraying with herbicides. The weeds or cover plants between the rows transpire water and in this compete with the tree crop for water. This can be reduced by spraying or slashing back the weeds or covers before an anticipated dry spell, their debris will still afford some protection and organic matter, but because it is beneficial in other ways the vegetational cover should not be eradicated permanently.

On flat land the main measures for water conservation are to preserve the soil surface in a condition favourable for infiltration, and to improve the soil structure and water storage capacity. These are enhanced by plants whether crops or covers. Competitive transpiration by weeds should be reduced either by intensive cultivation of the crop itself to provide the cover of vegetation, or by keeping the weeds or covers under control when for example a tree crop is still young.

The Climate as a Resource

Apart from the soil and its nutrients, plants require warmth, rain and sunshine to grow. The lowlands of Malaysia are never too cool for crop production. The amount of sunshine varies from adequate to abundant. Water is needed in order to take advantage of abundant sunshine. The average amount of rainfall varies from just enough to balance evaporation in some places to a great excess in the hills. There is also variation throughout the year such that excess at one time may not compensate for seasonal deficit. The key to the use of Malaysia's climatic resources is to provide water where it is needed from the surplus elsewhere at other times; moreover the measures to provide for this are closely related to those for flood prevention. In a country where heavy downpours are a recurrent feature, uncontrolled excess rain can soon prove the source of disastrous floods. Whether or not it proves feasible to precipitate monsoon rains over the seas before they reach Malaysian

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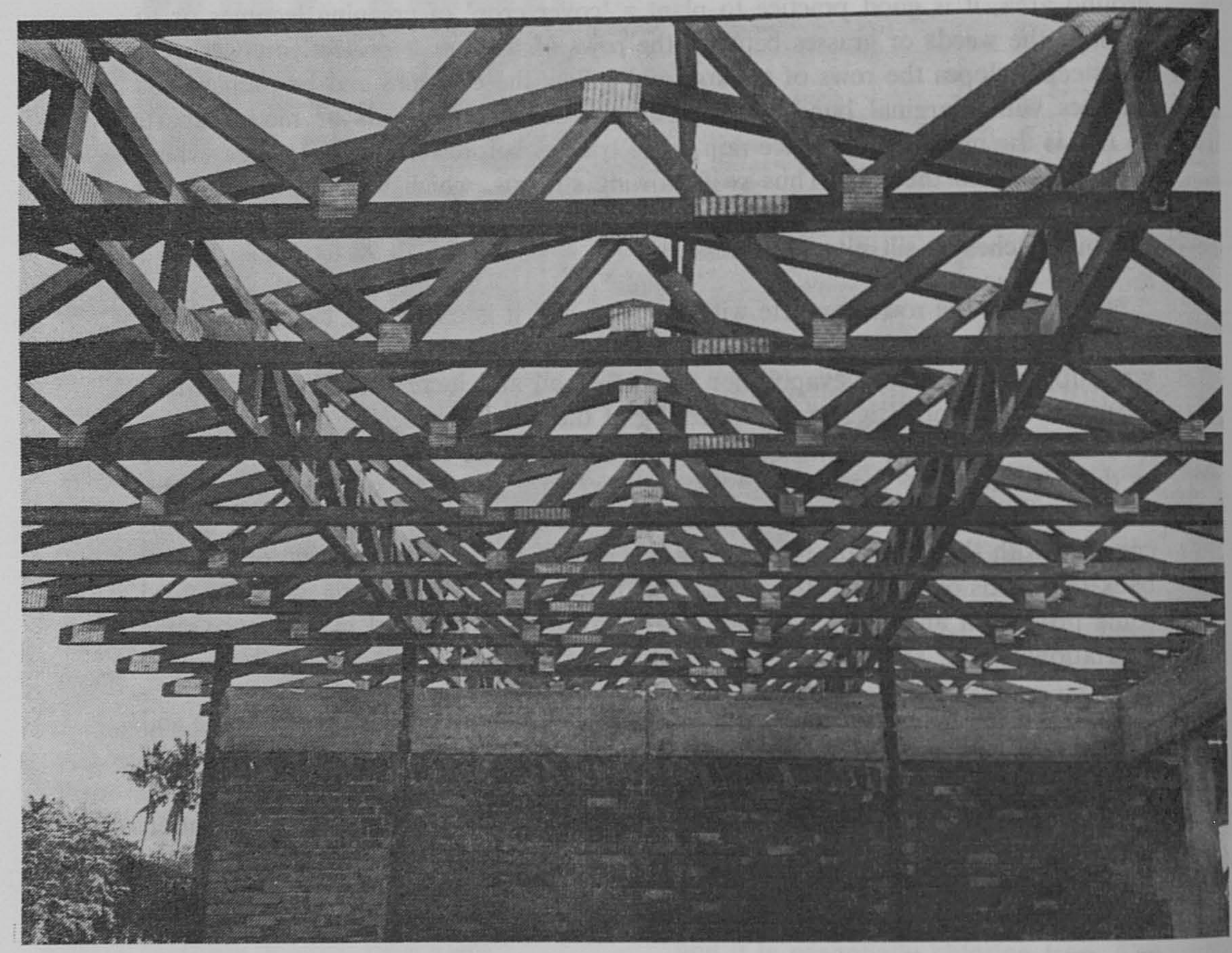

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shores, this will not prevent intense storms of accident rain arising from convection currents inland. The coordination of water conservation and flood prevention is an obvious necessity and considerable advances have already been made by the Drainage and Irrigation Department in Malaysia. Even so serious floods involving loss of life and property in recent years show that there is no reason for complacency. Land and other development schemes may result in forest clearance and earth moving activity for various constructions from almost the headwaters to the mouths of the rivers. Under these conditions one of the periodically recurrent heavy storms can do immense damage, unless conservation measures are constantly being applied.

The coordination of conservation practices adapted to hill and plain, results in the managed landscape or planned land system. Some of the most valuable agriculturally are those in which a flat or undulating coastal plain or interior plateau of fertile soil receives abundant solar radiation but only seasonally adequate rainfall and is able to make up this deficit by irrigation from protected catchments in the hinterland. The course of the water from catchment to the sea must be gentle and controlled; often it can serve as a public utility on the way. If this type of landscape is mismanaged, its resources are not only wasted but disaster is almost inevitable throughout the whole.

Another landscape common in Malaysia has excessive precipitation throughout from coast to mountain. This cannot cope with even greater flows in the plain, where soils are often less fertile in these cases owing to peat formation. These swampy lowlands, as in Sarawak, may be more suited to continued forestry and the introduction of industrial developments requiring large amounts of water and raw forest products, for example pulp and paper manufacture.

In such planned landscapes, where both large areas and protective strips—for example along river banks—are maintained under appropriate vegetation there will be room for wild life and recreation to meet the needs of the aesthetic conservationist as well as the applied conservator; the country will continue to display a fresh and beautiful countenance while exploiting its economic, including climatic resources.

(Next month: SOIL)

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The monthly crop

Negri Sembilan Branch will hold a seminar on Labour Management on Saturday 26 August at the Sungai Ujong Club, Seremban. The seminar will last from 09.30 to about 15.00 hrs the same day, and the subjects to be covered will include:

"Leadership and Human Relations" by the Director (or his appointee) National Productivity Centre.

"The NUPW and the Plantation Industry" by Enche Aziz Mirza, Director of Research, NUPW.

"The Role of MAPA in the Planting Industry" by Enche S. Balakrishnan, Industrial Relations Officer (Central).

The Society's Council have commended the enterprise of this Branch and have voted them a small grant which has helped to keep the registration fee down to $3/-. Members of other Branches are particularly welcome to attend and there will be places for about 60 of them. Further details will be found in the Supplement.

The Secretary of the NRPRA (Natural Rubber Producers' Research Association) Mr P D Wickens has written to us, and ends his letter: "Finally, may I say that you and your Members are most welcome to visit us when in the UK. Please make a note of our address—our Laboratories are at Welwyn Garden City for the next two years, then moving to Hertford." Mr Wickens has sent us a number of copies of the Association's leaflet entitled "Activities and Projects 1972". These are available to members on request, together with the Association's Annual Report for 1971, which has just reached us. The NRPRA are at 19 Buckingham Street, London, WC2.

The well-dressed witness is the exception rather than the rule in the country's courts of law; but all that may be changing. As a *Straits Times* headline reported on 1 July: DOCTOR TESTIFIES IN $60,000 SUIT.

Registration for our 1972 Oil Palm Conference in November will open next month and a registration form will be contained in *The Planter*. The Society's last conference on this crop was held four years ago and the many papers already received reflect the considerable advances in the research and development of new techniques. Enthusiasm for the coming conference is running high, even to the extent of a leading U.S. chemical company offering us a cocktail party. Following a few seconds close deliberation, the conference committee decided to accept the offer.

A provisional programme will be announced next month (August).

The Selangor Planters' Association are about half way through their annual Estates Football Competition. Each team is required to play eight matches and the two teams with the highest number of points will meet in the final in August. The results to-date are:

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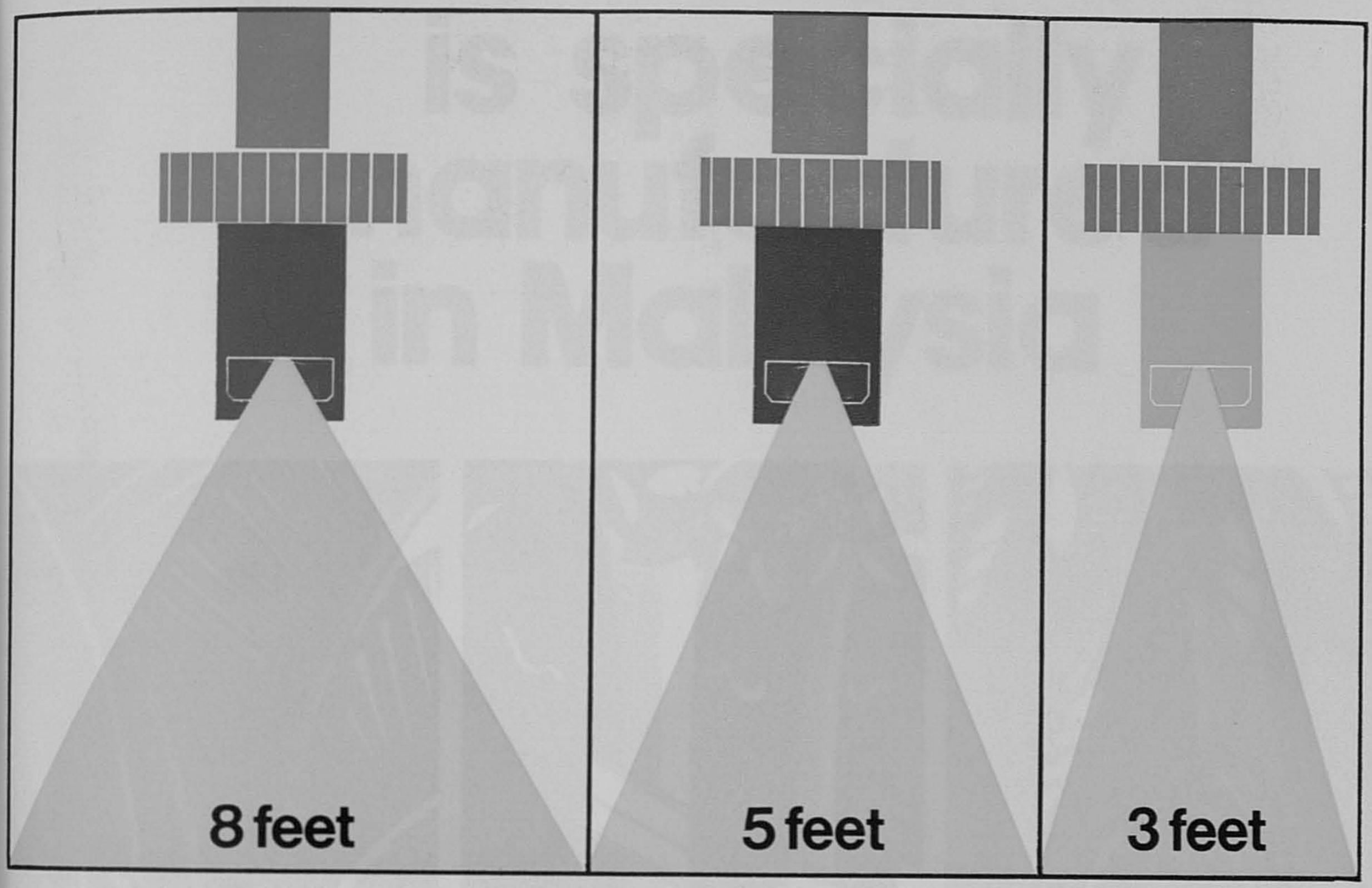

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TEAM	*P*	*W*	*D*	*L*	*F*	*A*	*Pts*
Oil Palm Research Station	4	4	0	0	13	1	8
RRIM Experiment Station	4	4	0	0	18	2	8
Dusun Durian Estate	4	3	0	1	10	4	6
Prang Besar Estate	4	2	1	1	11	5	5
Pilmoor Estate	3	1	2	0	5	3	4
Edinburgh Estate	5	2	0	3	6	9	4
Ampar Tenang Estate	4	0	1	3	5	20	1
St Andrew Estate	4	0	0	4	0	16	0
Elmina Estate*	4	0	0	4	1	9	0

* Withdrew from competition after Round 4

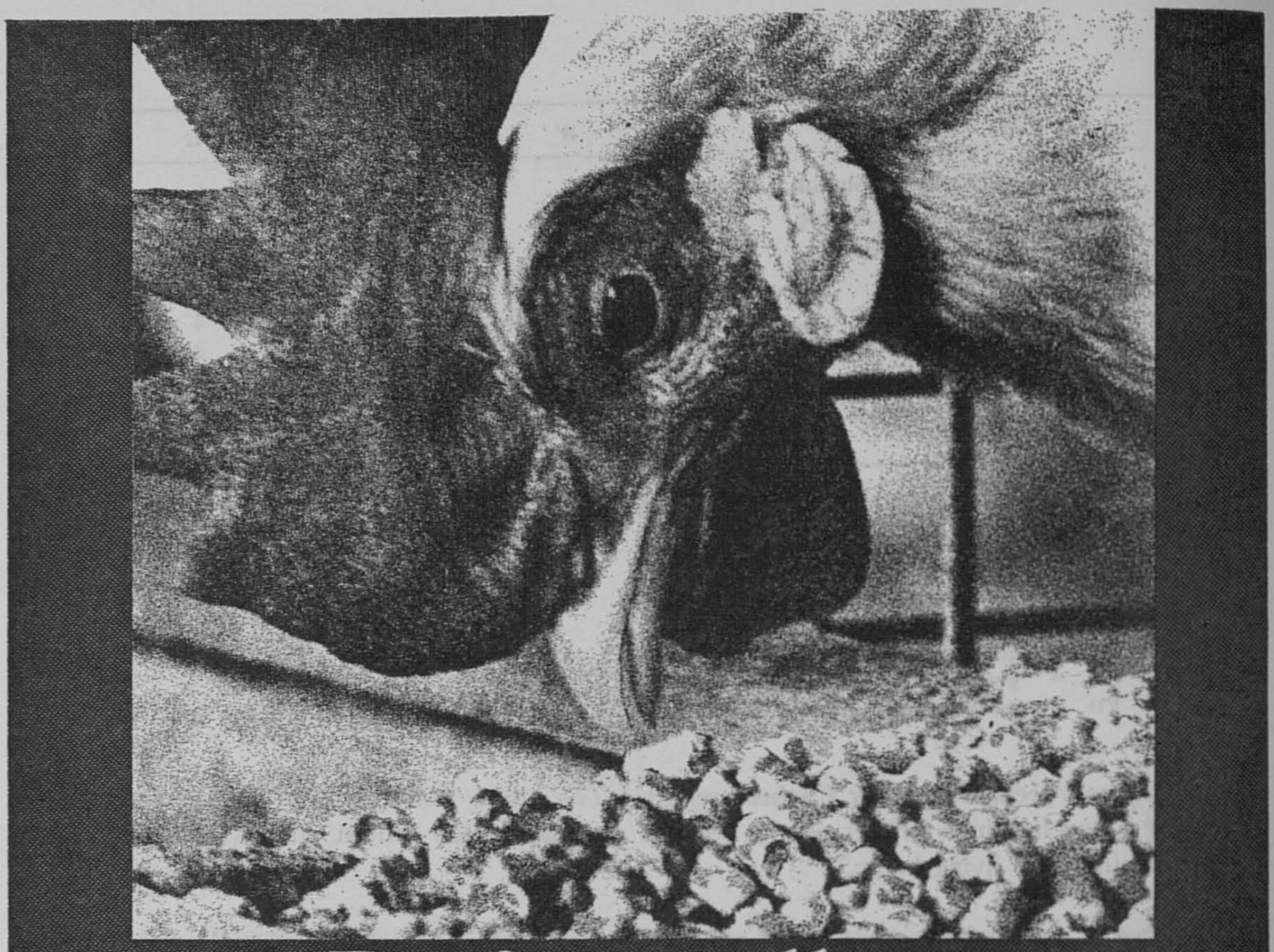
P = games played
W = games won
D = games drawn
L = games lost
F = goals scored by team
A = goals scored against team
Pts = points gained; calculated at the rate of 2 per win, 1 per draw, and 0 for a loss.

"Success seemed near for Fischer" reported *The Malay Mail* (17 July) "at the end of a day in which he was on the point of abandoning the contest after a series of disputes and flying home."

Two of the Society's most useful publications are now out of stock and will not be re-printed, as they are to be superseded or revised. They are "Planting Techniques for Oil Palms in Malaysia" and "Diseases and Disorders of the Oil Palm in Malaysia." As possessors of these books will know, they remain extremely useful, and there is quite a number of members who have been disappointed at not being able to get hold of copies. We will always be happy to act as a post box between the "haves" and the "have-nots" and in this regard Enche Lim Men Jang, Asia Oil Palm Sdn Bhd, Sungei Lepar Estate, Sri Jaya New Village, Pahang, would like to get hold of a copy of both these publications. Offers direct to him please.

The rubber world was recently centred on the south coast of England where Rubberex 72 was held at Brighton. The worst luck in the world befell the Goodyear Company at this combined exhibition and conference. According to *Rubber Journal*, the sponsoring publication for the exhibition, Goodyear's airship "Europa" was due to come down to Brighton for the occasion but an un-scheduled nocturnal flight culminated in a somewhat deflating encounter with a tree. The chief of Goodyear Airship Operations described the accident as a pure freak and the first such mishap for Goodyear in 300 airships. Latest information however is that "Europa" is again sailing the skies.

The full, edited proceedings of the Society's Cocoa and Coconut Conference held last November are now at the printers. First copies are expected off the press late in August and an order form for this book will be contained in next month's issue of *The Planter*.



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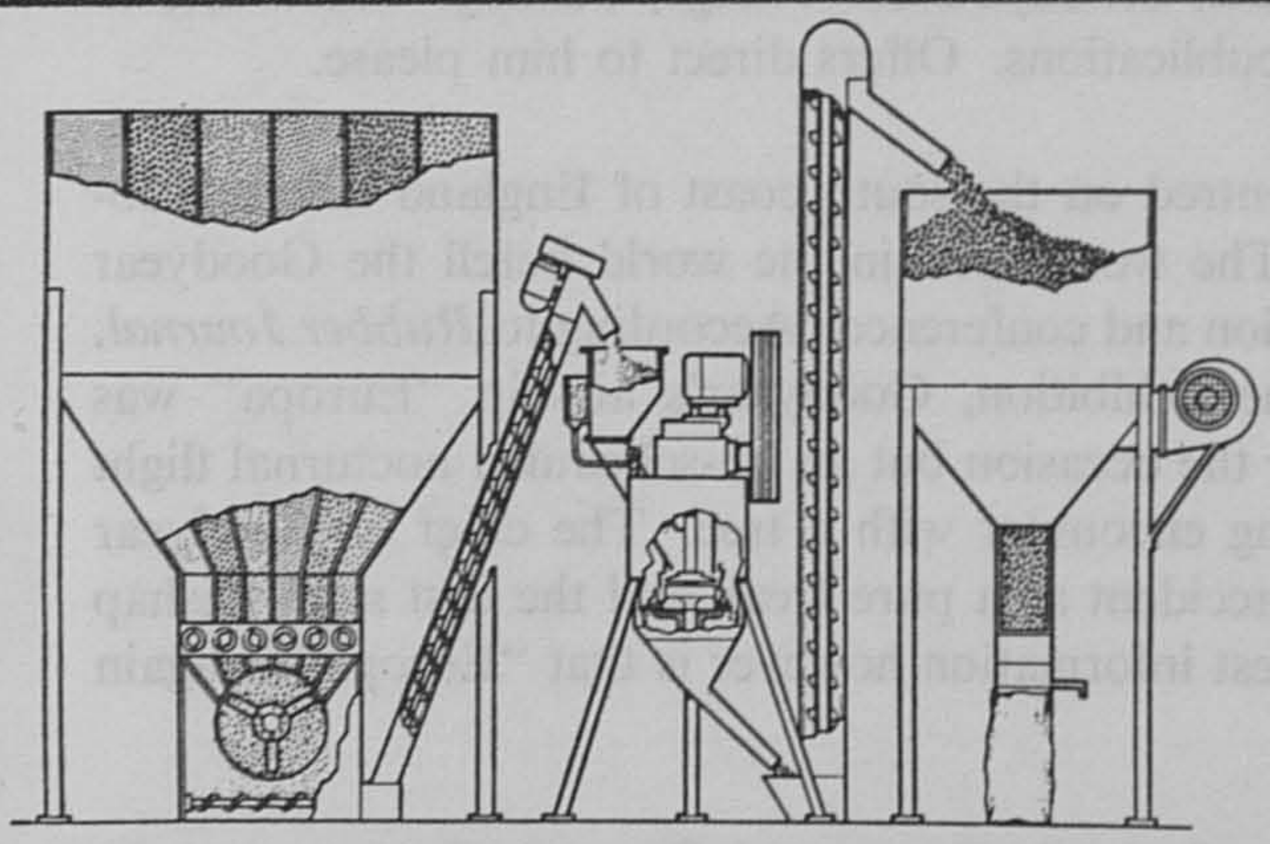

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DATELINE KUALA LUMPUR

The Government has declared 200 square miles of forest in Upper Perak a forest reserve. A local newspaper quoted Chief Game Warden Mohamed Khan bin Nomin Khan as saying the "area contained more than 30 elephant and 40 seladang".

At a glance, the area set aside for the reserve seems impressive. But if you consider that 10 miles × 20 miles constitutes 200 square miles, there isn't really all that much room. The elephant, for example, may travel up to 10 miles a day in search of food. A day and a half or two days of foraging would easily bring a herd out of the relative safety of the reserve, and if the rest of the area around is opened up for settlement, a confrontation between man and elephant is inevitable.

Moreover, it is discouraging to note that the two species of animals now number less than half a hundred each in the area, and any minor change in the habitat, any indiscriminate trapping or shooting can easily spell the end of the seladang and elephant there. Apart from making the area a game reserve, more concrete measures are perhaps needed. There is the problem certainly of policing an area where the communists are making their presence felt, but if our security forces could be roped in to do their bit for conservation, a good deal more could be achieved. At the same time, the Information Department might be persuaded to take time off from anti-communist propaganda and tell villagers something of the need for preserving our wildlife.

Up to the present, there has not been too much co-ordination between conservationists and the Government mass media. The urban conservationist might scream and press for games laws, animal sanctuaries etc., but somewhere along the line, the villager with his shotgun seems to have been overlooked. In the final analysis, his re-education might be more effective than threats of dire punishment and game laws. So now, if we could only get our information vans to change their tune a little in the kampongs.

Quite apart from pure legislation, it would be more heartening to hear that the Game Department for instance, had been given more staff, or that poachers had been caught and exemplary punishment meted out. Conservation in Malaysia has all along depended upon a group of dedicated people (Dr P. R. Wycherley was a shining example) where the Government has most of the time been content with

armchair legislation and speechifying. This is not an indictment of our Game Department, which is doing its gallant best with strictly limited funds and even less sympathy from the publc.

The newspaper report quoting Inche Mohamed Khan added that a new national park was also being planned for Johore. The report sounded almost pathetic when it remarked: "Parts of this proposed park were known to contain numbers of the rare Sumatran rhinoceros". The one-horned Sumatran rhinoceros in West Malaysia has assumed the proportions of an almost mythical creature in the last decade; heard about so much but never seen. No one knows for sure how many of the creatures still survive, if any. Let's hope then that the proposed park will help to save the animal and that the giant Johore Tenggara land scheme will not reduce our Sumatran rhinoceros to the status of the dodo.

On the credit side, the Game Department has gone ahead with plans to capture a pair of seladang for Zoo Negara. Corrals for trapping the animals have been nearly completed and should the project be a success, there is the chance that the pair would form the basis of a future herd for the zoo. With the present proliferation of land schemes in the country, it seems that the only chance of saving our rarer animals will be to establish breeding colonies in zoos and totally protected sanctuaries. In this case, much more research in breeding and feeding habits will be needed.

A case for fruity patriotism has been made out. In truth, it's bad taste to go after all that foreign stuff like apples, pears and oranges; it's nobler to eat local. But nature has not been exactly co-operative, and there is the problem of markets being suddenly flooded with langsats, rambutans or mangosteens contrasting with those occasions when it is impossible to track down even the normally assertive durian. There is talk of using hormones to control the fruiting cycle to ensure a year-round supply of the local stuff.

However, the local fruit industry will have to be seriously re-organised if it is to become a real success. Fruit-growing has been rather haphazard up to now and there have been no attempts at serious commercial fruit-growing, apart from the pineapple industry.

It's another case of research outstripping the rest of the industry. For example, the Food Technology Division of the Agriculture Ministry has produced quite a number of methods of canning and preserving local fruits. Papaya sauces, jams and preserves have been churned out by the division's laboratories—but a reliable supply of local fruits to get a viable industry going still seems a long way off. For example the papaya—one of the potentially valuable local fruits—is still not cultivated commercially, and remains a "back-yard" fruit. Until local fruits can be grown on a commercial basis rather than as a secondary crop, the fortunes of local fruits will continue to fluctuate. So eat local fruits—whenever you can!

Suffolk House—residence of a Penang governor in the 1800s—is falling down. And so is Bukit Taman, a distinctive landmark adjoining Templer Park near Kuala Lumpur. There is a danger that both will fall victims to progress. Suffolk House will very likely be down to make way for a hostel while Bukit Taman faces the threat of quarrying operations.

Historical sites in Malaysia have always been either ignored or abused, but there are encouraging signs all the same. The president of the Penang Historical Society, Capt. Mohamed Noor, has leapt into the fray to save Suffolk House while Selangor Mentri Besar Dato Harun Haji Idris has promised to do his best to ensure that Bukit Taman will not make its way into a cement factory. Let us hope that commonsense will prevail.

J M N

Gordon Follett Walker

It was a sad shock to his many friends to learn of Gordon Walker's sudden death in Edinburgh on 30th June, just a few weeks after his 50th birthday.

Following war time service as a fighter pilot in the RAF, Gordon came to Malaya in 1948 and began his planting career with Jugra Land and Carey Ltd. In 1953 he joined Commonwealth Development Corporation (C.D.C.) and was posted as Senior Assistant to Kulai Oil Palms in Johore where he remained until 1959, later transferring to Mostyn Estate in Sabah. Kulai was a particularly tough spot during those days and Gordon's first Manager (W.A. Gibson) was killed in a terrorist ambush on the estate. Gordon was himself wounded in a later ambush and it was typical of his courage and determination that he lost no time in discharging himself from hospital and getting back to work.

Gordon left C.D.C. in 1960 to take up the post of Senior Assistant on Batu Kawan Estate, Province Wellesley, later becoming its Manager. While at Batu Kawan the estate was successfully converted to Oil Palms, including the installation of a new palm oil mill.

His friends in Kedah will particularly remember the magnificent support he gave to the Society's Car Club, then in its heyday. Rally marshalling in all weathers and at all times of the day and night, and always on hand to assist at other clubs' events, (the Royal Perak Motor Club in particular will always be grateful to him), Gordon was a colleague in whom one could place complete reliance in everything he volunteered or was asked to do.

In 1967 Gordon retired and took Jes and the children down to Perth, Western Australia where they spent 2 years before returning to their native Edinburgh.

Gordon was a sound planter, a loyal colleague and a stimulating and amusing companion. He and Jes enjoyed a close and happy relationship and had a wide circle of friends. He will be sadly missed. Our sincere sympathy goes out to Jes, and to Brian, David and Alison.

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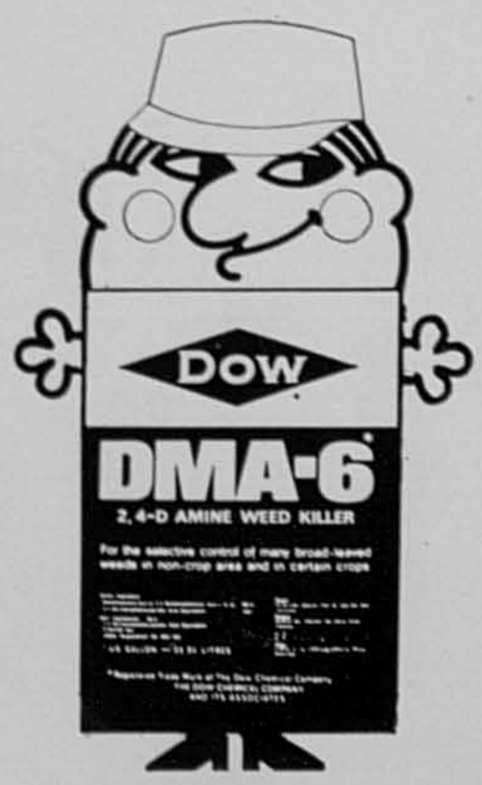

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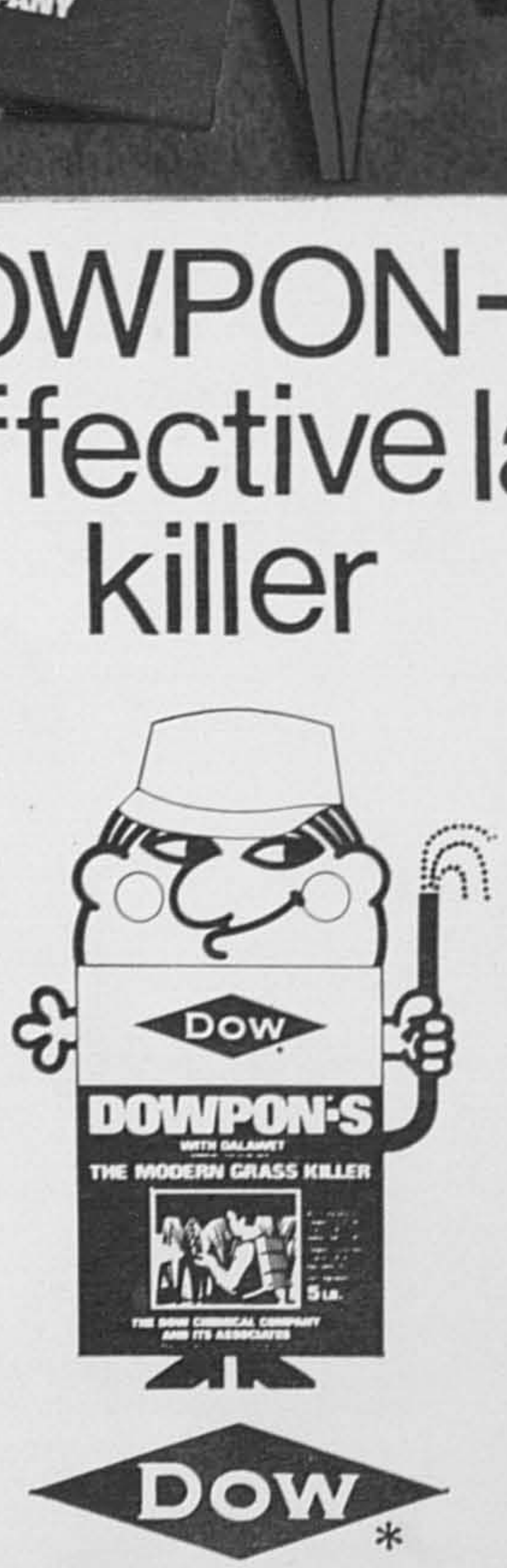

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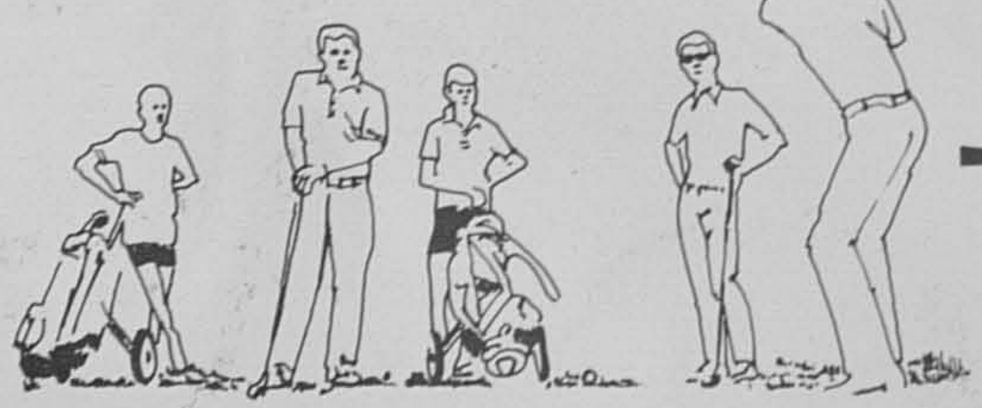

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Enche Mah Siaa Pong, Diploma in Natural Rubber Processing, Session 1971/72.

Enche Loo Kim Sing, Associate Diploma (AISP)—Central Perak.

Examination successes

Estate Book-keeping — 19 May 1972

Andrew Ding Hong Sing	(Sabah-North East)	Passed with Distinction
Chok Choo Yong	,, ,,	,, ,, ,,
Lim Kian Sang	(North Johore)	,, ,, ,,
G C Edmonds	,, ,,	,, ,, ,,
Thomas Ong Hong Tong	(Negri Sembilan)	Passed
Koh Tai Tong	(Malacca/Muar)	,,
Mohana Das	,, ,,	,,
Looi Eng Kooi	(Lower Perak)	,,
Loo Kim Sing	(Central Perak)	,,
Fong Jiew Seng	(Central Johore)	,,
Sharip bin Mamat	(North Johore)	,,
Tan Ah Leong	(Selangor)	,,
Yap Fook Kim	(Sabah-North East)	,,
Thong Hoh Yen	(Sabah-Tawau)	,,

Donations to Hostel Fund

Enche Johari bin Abbas, AISP	($100)
Mr Wm Newall	($110)
Mr A S Taylor, JP, FISP	($200)

On leave

5759 Allen, A W, Raintree Cottage, Romaldkirk, Barnard Castle, Co. Durham, U.K.

5423 Anderson, M A, 23 Clarendon Road, Edinburgh, Scotland.

4227 Barnwell, I M, AISP, Kantara, Western Balgeddie, Kinross, Scotland.

4936 Chiew Keng Wee, AISP, 603-D Hilir Garden, Ujong Pasir, Malacca.

5169 Hudson, I S, Danes Croft, Turleigh, Bradford-on-Avon, Wilts, U.K.

2042 Morton, R J, JP, FISP, c/o Chartered Bank, 38 Bishopsgate, London EC2N 4AH, England.

4655 Turnbull, G H, AISP, c/o Hall, 21 Dandenong Rd, Attadale 6156, Perth, West Australia.

4377 Wills, G A, AISP, "Hollyside", Brockweir, Nr. Chepstow, Monmouthshire, U.K.

5420 Yap Fook Kim, Sub-Health Centre, Sempang Bekok, Asahan, Malacca.

4373 Leow Sun Kong, 8 Lorong Timor, Petaling Jaya, Selangor.

Returned from leave

4715 Benton, D M, Sungei Kawang Estate, Bentong, Pahang.

5751 Chandler, F D, SDA, Gadek Estate, Tampin, Negri Sembilan.

Change of address

5392 Abdul Rahim bin Othman, New Labu Estate, Nilai, Negri Sembilan.

4667 Abdul Bar bin Johari, St. Helier Estate, Bahau, Negri Sembilan.

5841 Abdul Razak bin Abdul Ghani, Sengkang Estate, Port Dickson, Negri Sembilan.

3714 Butler-Madden, J K, Kumpulan Guthrie Sdn Bhd, P O Box 2516, Kuala Lumpur.

5850 Balachandran, R, Langkon Estate, P O Box 10, Kudat, Sabah.

4745 Dixon, R B, NDA, AISP, Dusun Durian Estate, Banting, Selangor.

3506 Doran, M St J, 44 Cambridge Road, Stretham, Cambs, England.

5365 Farquharson, A J C, SDA, c/o 15 Paget Close, Calehill, Wimborne, Dorset, England.

5685 Goh Geok Chai, Joseph, Lembaga Tabong Getah Sabah, P O Box 361, Kota Kinabalu, Sabah.

5669 Hamzah bin Jaafar, Seteshen, Penyelidekan 'MARDI', Jerangau, Wakil Pos Ajil, Trengganu.

4717 Irvine, Norman, Sabrang Estate, Teluk Anson, Perak.

5520 Khoo Khee Ming, P O Box 202, Batu Tiga, Selangor.

5787 Leong Ah Chye, 2 Tranquerah Road, Malacca.

5340 Lim Tam Jan, Tennamaram Estate, Batang Berjuntai, Selangor.

5453 Low Chee Kin, RRI Experiment Station, Sungei Buloh, Selangor.

5462 Mah Siaa Pong, Dip, NRP, Tebong Estate, Tebong, Malacca.

5341 Ng Khie Hup, South Estate, Carey Island, Port Klang, Selangor.

5784 Pawanteh bin Din, Benta Estate, Benta, Pahang.

4536 Ratnarajah, K, Tuan Estate, Bentong, Pahang.

4854 Roberton, N D, Mynthurst, 14 Yorke Road, Reigate, Surrey, England.

5830 Sumathri, G V, Wessyngton Estate, Rengam, Johore.

5813 Sivarajah, S, No 26, Jalan Laksamana, Sunrise Park, Kluang, Johore.

5525 Teh Yap Cheng, Singapore Polytechnic, P O Box 2023, Singapore 2.

5456 Unnikrishnan, K, Tong Hing Estate, P O Box 103, Masai, Johore.

4404 Veldhuis, J, Baronielaan 18, Son, Holland.

5276 Varughese, G, Tanah Merah Estate, Port Dickson, Negri Sembilan.

5618 Yap Nyoke Yong, Kepong Estate Group, Kepong, Selangor.

4757 Khoo Hong Thor, Robert, Sua Betong Estate, Port Dickson, Negri Sembilan.

5034 Menon, K A G, Hay Estate, Layang Layang, Johore.

Golden Wedding

TAYLOR — COLESHILL: John Alfred to Alice, at St. Ann's Parish Church, Tottenham, N. London, on July 25th, 1922.

Note: Mr Taylor's membership number is 24, and he joined the Society in 1919.

Death

WALKER (3577): Gordon Follett, on 30 June 1972, in Edinburgh, of a heart attack.

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