The Planter

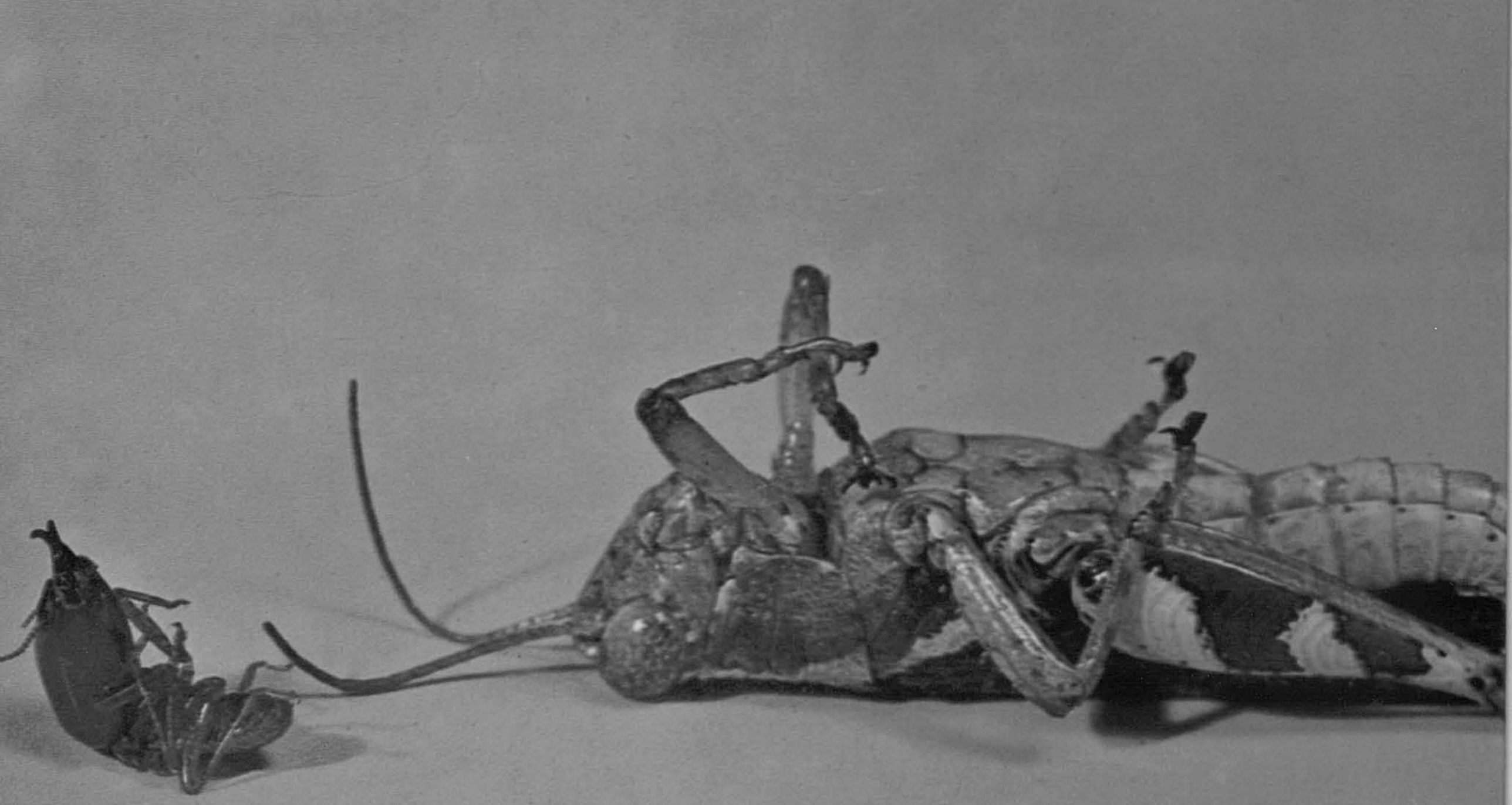
DIELDREX 15 is by far the favourite insecticide against a whole range of plantation pests.

It gives the most economical control of grasshoppers on young rubber, termites in rubber, grasshoppers on cover crops, cockchafers and grasshoppers in oil palm, termites in cocoa, ants in pepper, padi pests, orchid pests, mosquitoes, cockroaches, cutworms, ants. And it's the best way to protect buildings against termites.

But get all the details from your nearest Shell office.

Remember: **if you need a chemical —or you think there may be a chemical that might help you—call Shell Chemicals.**

Most economical termite terminator, grasshopper bopper etc.



Shell Chemicals

The Planter

KDN 6686

MAGAZINE OF THE INCORPORATED SOCIETY OF PLANTERS

VOL. 49 JUNE 1973 No. 567

Publishing Office :

Pesiaran Lidcol
P O Box 262
Kuala Lumpur 04-06
MALAYSIA

Telephone : 86396

Telegrams : ISPLA

Price : M$2.50

Annual Subscription : M$30.00

Editorial Committee

W Newall (*Chairman*)
D A Earp (*Editor/Manager*)
B C Stone PHD
R L Wastie MA PHD FISP (*Technical Editor*)
E Pushparajah M AGRI SC, M I BIOL

NOTE

The Planter assumes no responsibility for the statements and opinions expressed by contributors.

The Incorporated Society of Planters

Founded 1919

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

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

To promote the general interests of the planting profession.

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

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

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

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

MEMBERSHIP of the Society is open to: —

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

B Executive engineers, estate medical officers, and qualified scientific or administrative staff of estates or organisations mainly concerned with the planting industry.

Category B may include those employed in such other senior executive, administrative, professional or advisory capacities as may be deemed by the Executive Council as being equivalent thereto

Neither category shall include clerks, conductors, hospital assistants, etc.

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

ANNUAL SUBSCRIPTION RATES are as follows: —

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

Contents

June 1973

Page

Editorial

Plantation Management in the Seventies - 221

Technical

Conservation in Malaysia
Part Eight — Conclusions *P R Wycherley* 222

Work Study: the technique of work measurement (2) *J S Ballard* 245

General

The monthly crop - 251

Appointments vacant - 252

Pesticides in the modern world - 253

Hotel concession rates for ISP members - 256

Dateline Kuala Lumpur - 257

A race for survival - 259

The ISP Schools Association - 267

Social and Personal - 269

Officers

Chairman

Tan See Yeok AISP
RRIM Experiment Station
Sungei Buloh Selangor

Vice-Chairman

Khoo Kay Tuan AISP
Lothian Estate
Nilai, Negri Sembilan

Executive Secretary

D A Earp
P O Box 262
Kuala Lumpur Selangor

Executive Committee

Tan See Yeok AISP (*Chairman*)
Khoo Kay Tuan AISP (*Vice-chairman*)
D A Earp (*Secretary*)
D W E Hay
Ismayuddin b Abdul Manan
J G M Price
W Newall
J B McIntosh

Technical Education Scheme Committee

J B McIntosh (*Chairman*)
D A Earp (*Secretary*)
Khoo Khee Ming B Agric Sc
C J Sergeant NDA AISP
Tan See Yeok AISP
Tan Teo Kim

Finance Committee

Tan See Yeok AISP (*Chairman*)
Khoo Kay Tuan AISP (*Vice-chairman*)
D A Earp (*Secretary*)
D W E Hay
G C McCulloch FISP
Ismayuddin b Abdul Manan
J G M Price
W Newall
J B McIntosh

Executive Councillors

Ismayuddin b Abdul Manan *Kedah/Penang*
Tan Kee Boo AISP *Perak Central*
Lee Kim Thian AISP *Perak Lower* (Acting)
D W E Hay *Selangor*
O F Wakefield *Pahang West*
Vincent Tan *Negri Sembilan*
P W Hanson *Malacca/Muar*
B Allen-Edmett *Johore North*
Mahbob b Abdullah AISP *Johore Central*
J G M Price *Johore South*
Kelantan/Trengganu
K P Jeyarajah *Trengganu South/Pahang East*
Thong Hoh Yen *Sabah: Tawau*
A J Wong *Sabah: Northeast*
Lai Thian Sang *Sarawak*
G C McCulloch FISP (co-opted)
W Newall (co-opted)
J B McIntosh (co-opted)

Editorial:

Plantation Management in the Seventies

This is the title of the symposium which the Society will sponsor and organise at the Kuala Lumpur Hilton in November, and the subjects to be discussed were listed in our May issue.

The organising committee have thought hard about the vexing question as to whether participation in this symposium ought to be restricted, and now that a decision has finally been made to define in advance the size of the symposium, our members in particular are entitled to be told why.

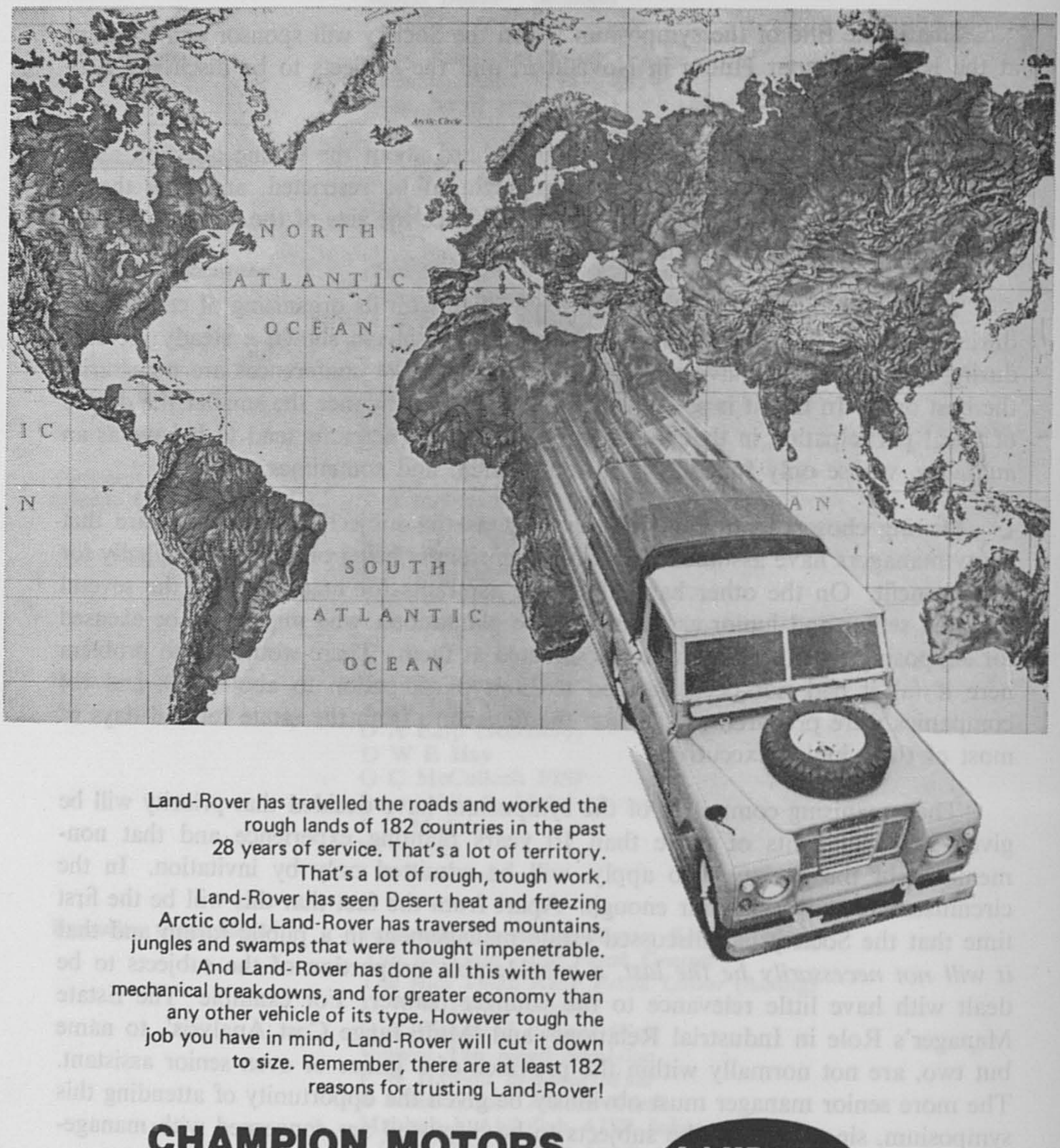
The Society has gathered a lot of experience with its organising of conferences during the past six years, and whereas attendances have shown a steady increase during this period, we have never held that the biggest conferences are necessarily the best ones. In fact it is seen that the larger the attendance the smaller the degree of vocal participation in that the vast majority of participants tend to behave as an *audience,* whose only function is to look, listen, and sometimes applaud.

Having chosen Plantation Management as the subject, the ISP is aware that many managers have assumed that the symposium is being organised principally for their benefit. On the other hand there are aspirants for management: the several hundred senior and junior assistants on the plantations, who might also be excused for supposing that the symposium is directed at them. There would be no problem here if (a) it had not been decided to limit participation to about 250, and (b) companies were prepared to sanction the departure from the estate for 3–4 days of most of their junior executives.

The organising committee of the symposium have decided that priority will be given to participants of more than 10 years planting experience and that non-members of the Society who apply, will be admitted only by invitation. In the circumstances this seems fair enough. Apart from the fact that this will be the first time that the Society has discussed estate management in a public forum and that *it will not necessarily be the last,* a considerable proportion of the subjects to be dealt with have little relevance to the younger planter. For example 'The Estate Manager's Role in Industrial Relations' and 'Multi-range Cost Analysis', to name but two, are not normally within the province of a junior or even senior assistant. The more senior manager must obviously be given the opportunity of attending this symposium, since most of the subjects to be discussed are concerned with management now rather than in the future.

So it is that we enjoin patience in the younger member who is unable to attend this symposium. His turn will come, and in due course, if he is keen enough, he will be able to study the working papers. The Society, in breaking new ground, is determined to make the symposium a success, but the occasion must be kept within sensible bounds and everything possible done to encourage full and faithful participation from the floor.

182 countries can't be wrong!



Land-Rover has travelled the roads and worked the rough lands of 182 countries in the past 28 years of service. That's a lot of territory. That's a lot of rough, tough work. Land-Rover has seen Desert heat and freezing Arctic cold. Land-Rover has traversed mountains, jungles and swamps that were thought impenetrable. And Land-Rover has done all this with fewer mechanical breakdowns, and for greater economy than any other vehicle of its type. However tough the job you have in mind, Land-Rover will cut it down to size. Remember, there are at least 182 reasons for trusting Land-Rover!

CHAMPION MOTORS

A Member of the Inchcape Berhad Group of Companies

LAND-ROVER

Planter, Kuala Lumpur **49**: 222-244 (1973)

Conservation in Malaysia

P. R. WYCHERLEY

PART EIGHT — CONCLUSIONS

This series of articles opened with an account of the climate in Malaysia showing that two great renewable natural resources—sunshine and rain—are relatively abundant. The high potential productivity due to plentiful sunshine can only be realised by the wise use of water. As well as using the water in agriculture, industry and for domestic needs, it must be safely conveyed to the sea without causing floods or eroding the soil.

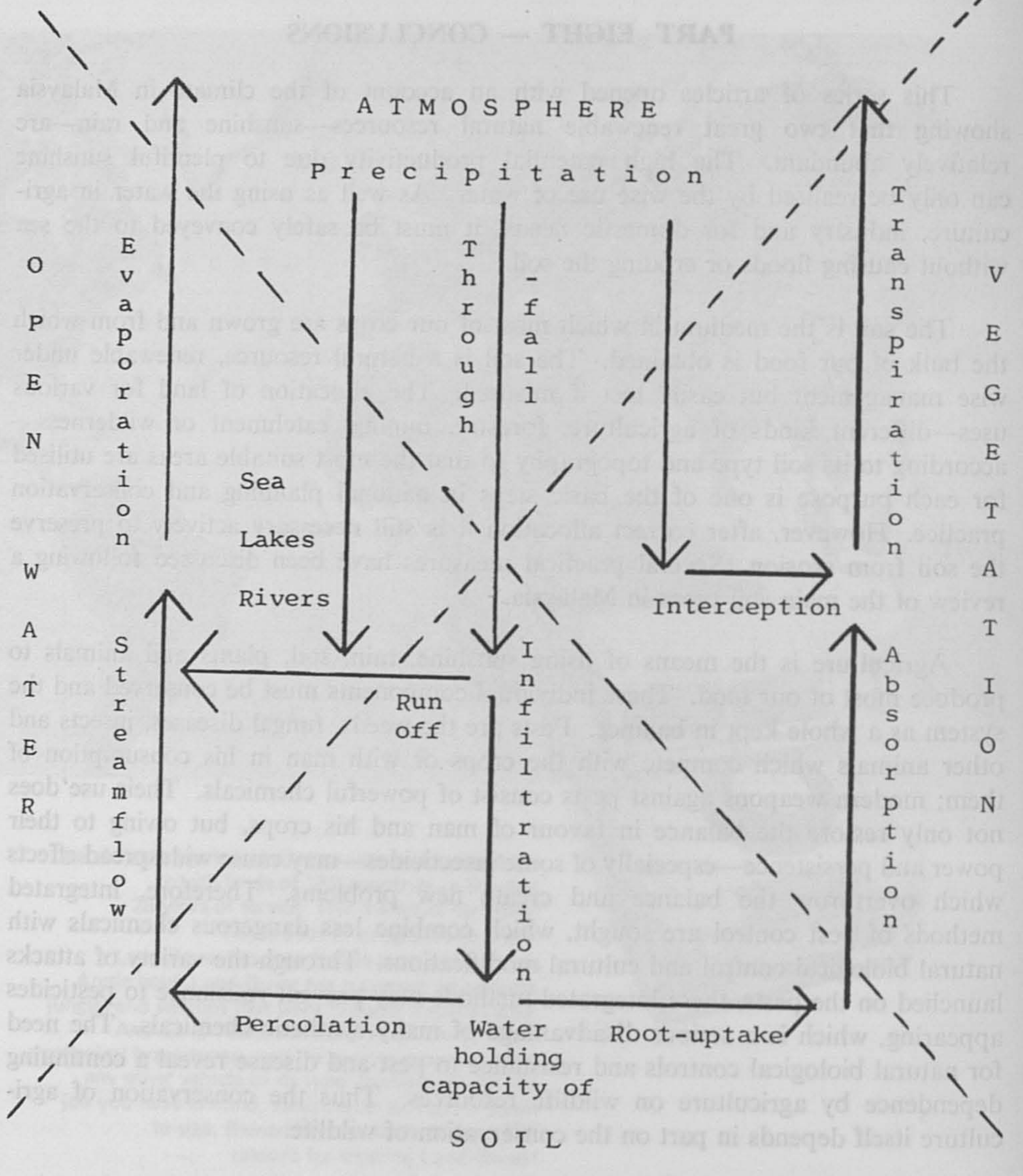
The soil is the medium in which most of our crops are grown and from which the bulk of our food is obtained. The soil is a natural resource, renewable under wise management but easily lost if misused. The allocation of land for various uses—different kinds of agriculture, forestry, mining, catchment or wilderness—according to its soil type and topography so that the most suitable areas are utilised for each purpose is one of the basic steps in national planning and conservation practice. However, after correct allocation it is still necessary actively to preserve the soil from erosion. Several practical measures have been discussed following a review of the main soil types in Malaysia.

Agriculture is the means of using sunshine, rain, soil, plants and animals to produce most of our food. These individual components must be conserved and the system as a whole kept in balance. Pests are the weeds, fungal diseases, insects and other animals which compete with the crops or with man in his consumption of them; modern weapons against pests consist of powerful chemicals. Their use does not only restore the balance in favour of man and his crops, but owing to their power and persistence—especially of some insecticides—may cause widespread effects which overthrow the balance and create new problems. Therefore, integrated methods of pest control are sought, which combine less dangerous chemicals with natural biological control and cultural modifications. Through the variety of attacks launched on the pests, these integrated methods may prevent resistance to pesticides appearing, which is a serious disadvantage of many synthetic chemicals. The need for natural biological controls and resistance to pest and disease reveal a continuing dependence by agriculture on wildlife resources. Thus the conservation of agriculture itself depends in part on the conservation of wildlife.

The spectacular rise of synthetic pesticides during the last 30 years has thus brought reaction and interaction. During the same period a new class of drugs, the antibiotics of microbial origin have emerged. Although some of these and other drugs such as the steroids can be synthesised in whole or part, there is an increasing dependence on natural sources either for commercial production or as templates for new drugs*. Our civilisation is an irreversible process, which may be directed now

---

*CHAN, K.C. & LOWRY, T.B. (1973). Steroidal sapogenins from *Dioscorea* in Malaysia. *Planter, Kuala Lumpur* **49**: 182–187 (1973).



The hydrological cycle or the circulation of water on the Earth

or in the future towards improvement or catastrophe, and its progress has produced many new needs. Except for perhaps Malthus himself, few would have predicted a century ago that contraceptive drugs would be regarded by many today as an essential means of restraining human over-population and so averting the collapse of our global civilisation by famine, disease or war over the remaining resources. So far the contraceptive drugs have come from natural sources. We cannot predict all our future problems or how they may be resolved. It is prudent to save representatives of as much as possible in anticipation of these future, but as yet undefined, needs.

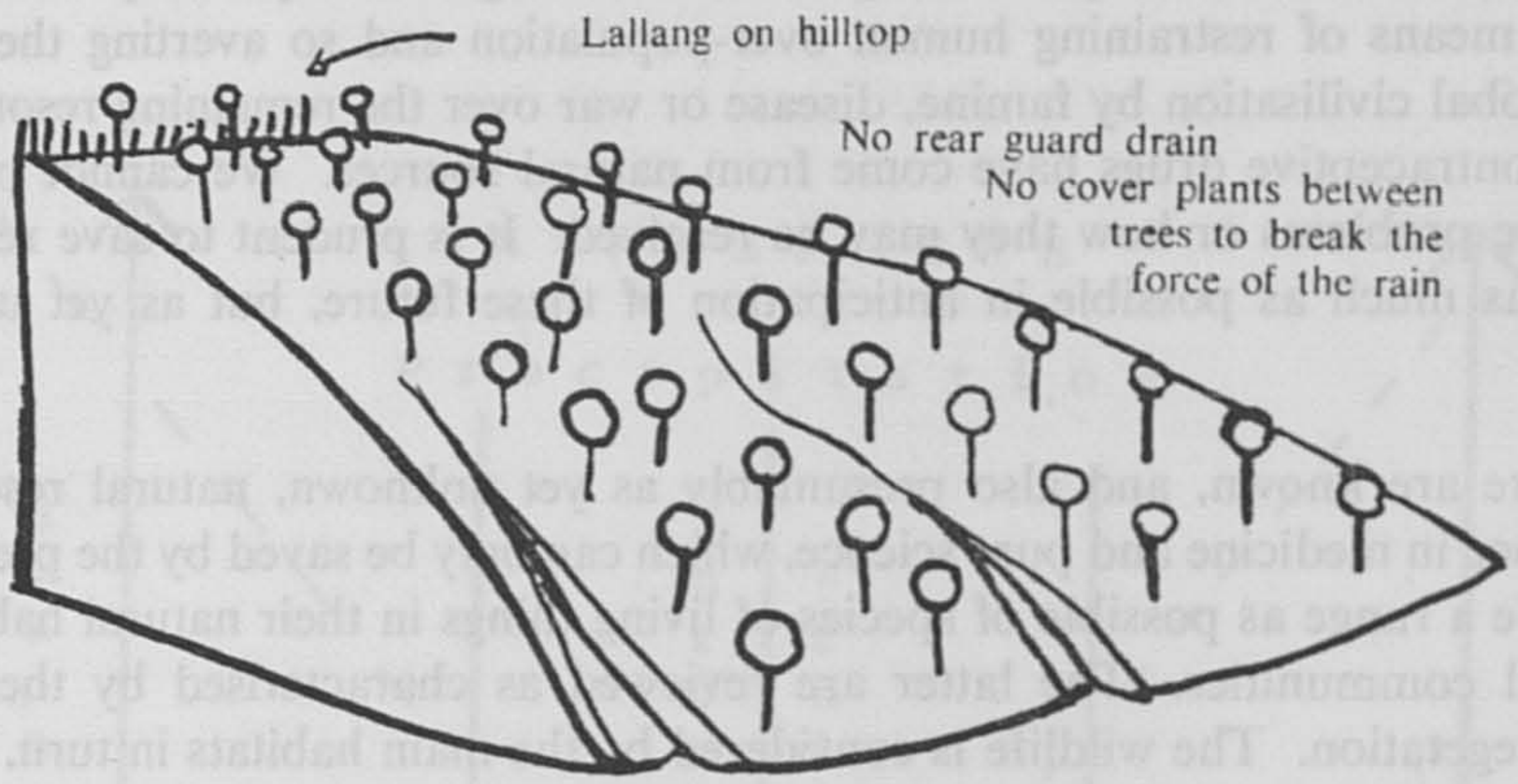
There are known, and also presumably as yet unknown, natural resources of significance in medicine and pure science, which can only be saved by the preservation of as wide a range as possible of species of living things in their natural habitats and biological communities. The latter are reviewed as characterised by their typical natural vegetation. The wildlife is considered by the main habitats in turn, mentioning those species which seem to be most seriously threatened with extinction and the causes of their critical condition such as habitat destruction, pollution, over-collecting and excessive hunting.

Finally, the need to conserve water, preserve wildlife, retain beautiful scenery and to provide for the growing requirements of an increasingly urban population to have some wilderness areas for recreation, relaxation and enjoyment are brought together in a review of Malaysia's present system of national parks, nature reserves and legislation to protect wildlife and proposals to improve these in future. National parks and nature reserves can be developed with suitable amenities and so become valuable assets, primarily to conserve the landscape, soil, water and wildlife, and in addition to provide revenue from tourists, work for local people, recreation for youth and sometimes meat by hunting and fishing, and finally to assist in education and nation building.

Since the Malayan Nature Society first championed a national and regional policy for conservation in 1961, there have been considerable changes in public opinion on both the local and international scales. Shifts in emphasis have been evident during even the brief periods between the original writing of this manual and its revision as a series of articles, chiefly characterised by a growing concern about pollution amounting almost to panic in some circles. There have been some significant practical achievements in this sector too. Nevertheless, although the prevention and correction of pollution are important, these are but the negative side of conservation.

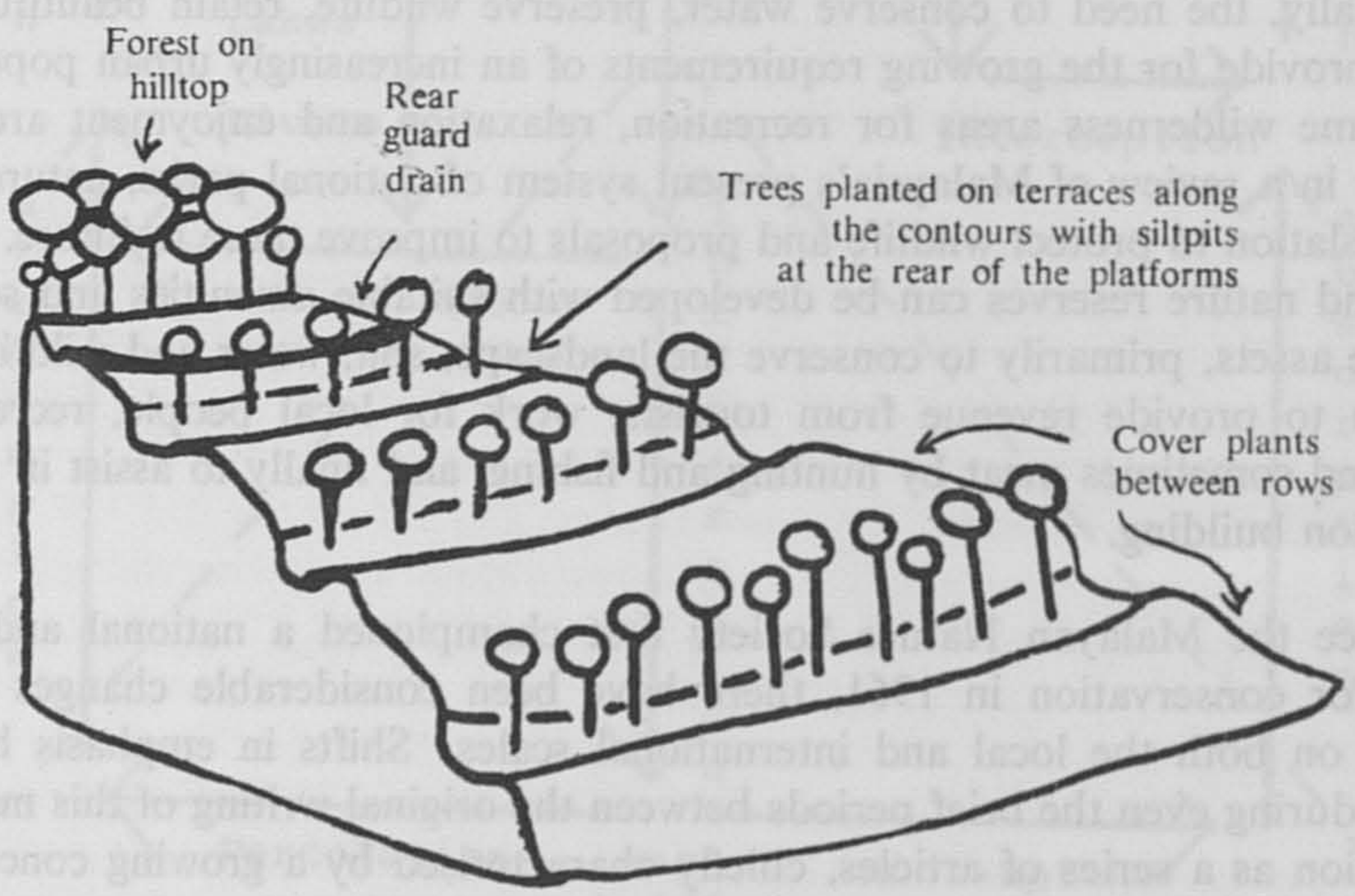
Also, despite zero population growth being vital for ultimate survival, it too can be considered as a negative aspect. The sense of complacency, that food production was catching up with demands three or four years ago, has been shattered by drought and famine more recently throughout the Indian sub-continent and the inability of the 'other worlds' (free or otherwise) to come to the rescue. This has slowed down population growth in the stricken areas by horrible means, but provided at the same time a spur to intensified exploitation. In Malaysia, famine is fortunately not imminent, the incentive is to provide employment, to raise the standard of

AN UNPROTECTED PLANTATION ON A HILL SLOPE LOSING WATER AND SOIL

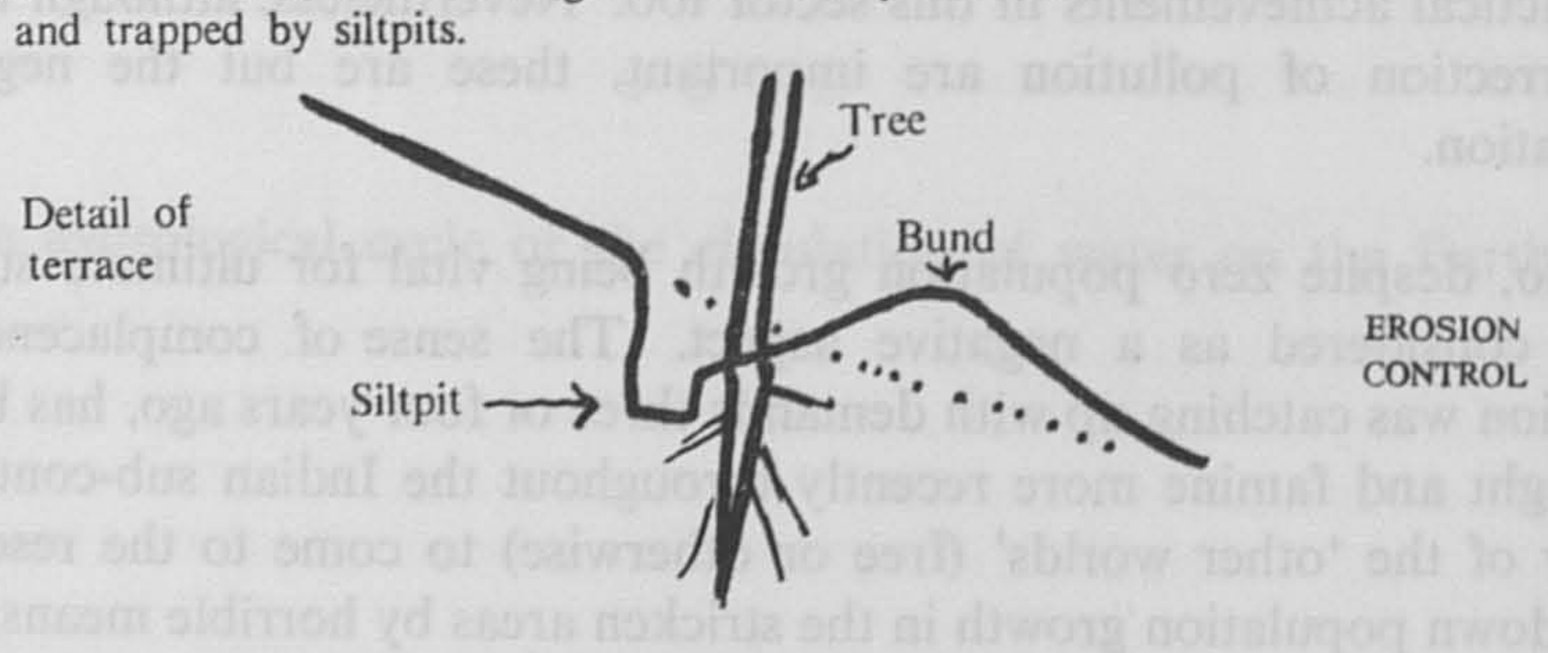


Tree rows run up and down hill, water runs unimpeded downhill scouring out gullies and carrying off topsoil

A PLANTATION ON A HILL SLOPE USING METHODS TO SAVE SOIL AND WATER

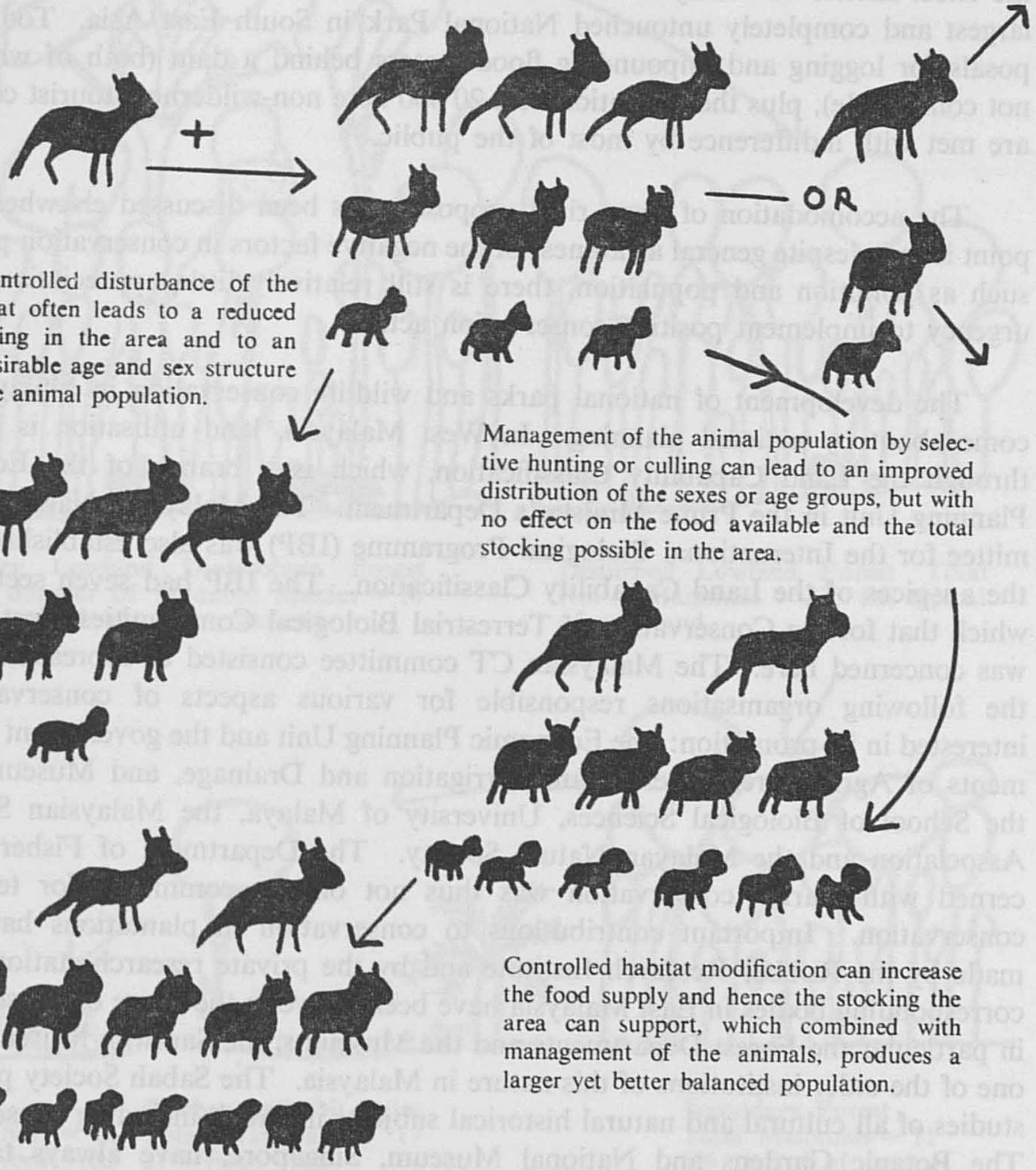


The force of the rain on the soil surface is broken by the cover plants, the flow of water downhill is broken at regular intervals by the contour terraces, water and soil and trapped by siltpits.



PRINCIPLES OF STOCKING AND MANAGEMENT

When an area carries the stocking of animals which the food available will support, the introduction of more animals dependent on the same food supply must be balanced in time by the departure or death of an equivalent number or mass of animals to restore the correct stocking. Attempts to overstock an area may lead to an unbalanced population.



Uncontrolled disturbance of the habitat often leads to a reduced stocking in the area and to an undesirable age and sex structure in the animal population.

Management of the animal population by selective hunting or culling can lead to an improved distribution of the sexes or age groups, but with no effect on the food available and the total stocking possible in the area.

Controlled habitat modification can increase the food supply and hence the stocking the area can support, which combined with management of the animals, produces a larger yet better balanced population.

The symbols represent respectively: —old or male animal, mature or female animal, and young animals. These diagrams should not be taken too literally, but rather as illustrating possible applications of stocking principles and wildlife management in reserves and parks.

living and to smooth out inequalities of opportunity. These are all very desirable objectives, but they do not create a good atmosphere for long term conservation planning.

For example the future of Taman Negara as an inviolate sanctuary to preserve Malaysia's wildlife in perpetuity is at present more critically threatened than twelve years ago. Ten years ago, when Taman Negara celebrated its silver jubilee, it was the sheet-anchor of Malayan wildlife conservation and took pride of place as the largest and completely untouched National Park in South East Asia. Today proposals for logging and impounding flood waters behind a dam (both of which are not compatible), plus the formation of a 20 000 acre non-wilderness tourist complex, are met with indifference by most of the public.

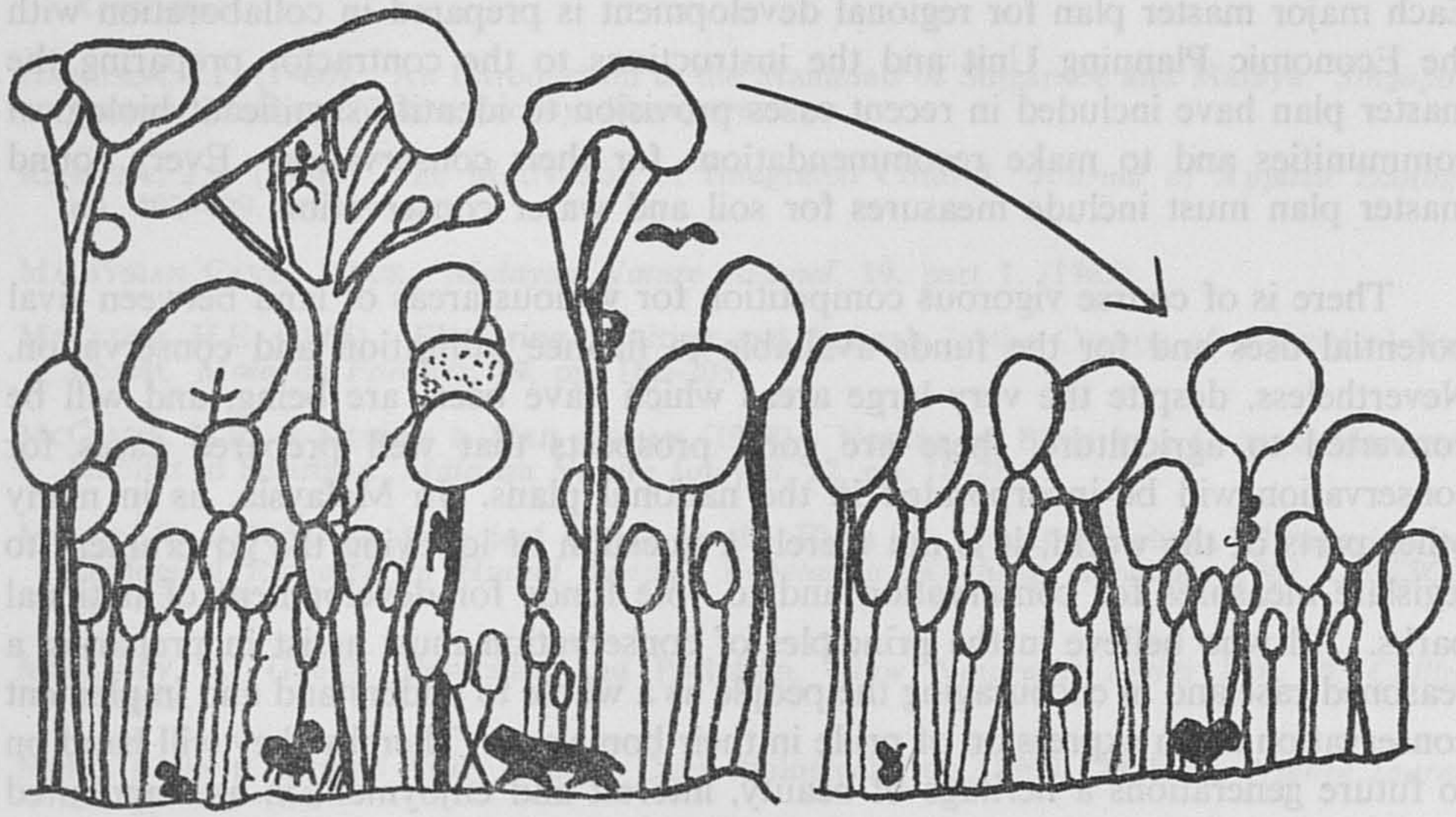
The accomodation of these rival proposals has been discussed elsewhere. The point is that despite general awareness of the negative factors in conservation planning such as pollution and population, there is still relatively little appreciation of the urgency to implement positive conservation action.

The development of national parks and wildlife conservation in Malaysia will come about by national planning. In West Malaysia, land utilisation is planned through the Land Capability Classification, which is a branch of the Economic Planning Unit in the Prime Minister's Department. The Malaysian National Committee for the International Biological Programme (IBP) was also established under the auspices of the Land Capability Classification. The IBP had seven sections, of which that for the Conservation of Terrestrial Biological Communities (Section CT) was concerned here. The Malaysian CT committee consisted of representatives of the following organisations responsible for various aspects of conservation or interested in its promotion: the Economic Planning Unit and the government Departments of Agriculture, Forest, Game, Irrigation and Drainage, and Museums, also the School of Biological Sciences, University of Malaya, the Malaysian Scientific Association and the Malayan Nature Society. The Department of Fisheries concerned with marine conservation was thus not on the committee for terrestrial conservation. Important contributions to conservation in plantations have been made by the Rubber Research Institute and by the private research stations. The corresponding bodies in East Malaysia have been active in the cause of conservation, in particular the Forest Departments and the Museums, the Sarawak Museum being one of the older institutions of this nature in Malaysia. The Sabah Society promotes studies of all cultural and natural historical subjects in Sabah including conservation. The Botanic Gardens and National Museum, Singapore, have always taken an interest in conservation of the whole region although not situated in Malaysia itself.

It was proposed that subsequent to the recent winding up of IBP operations themselves, various bodies would continue the work of each section in the different participating countries. Although the work of some sections continues in Malaysia, that of the CT section has unfortunately become orphaned. The data collected by the CT section and other parties may be incorporated in proposals for conservation prepared by the Malayan Nature Society for example, even if the direct liaison with government departments has been suspended temporarily.

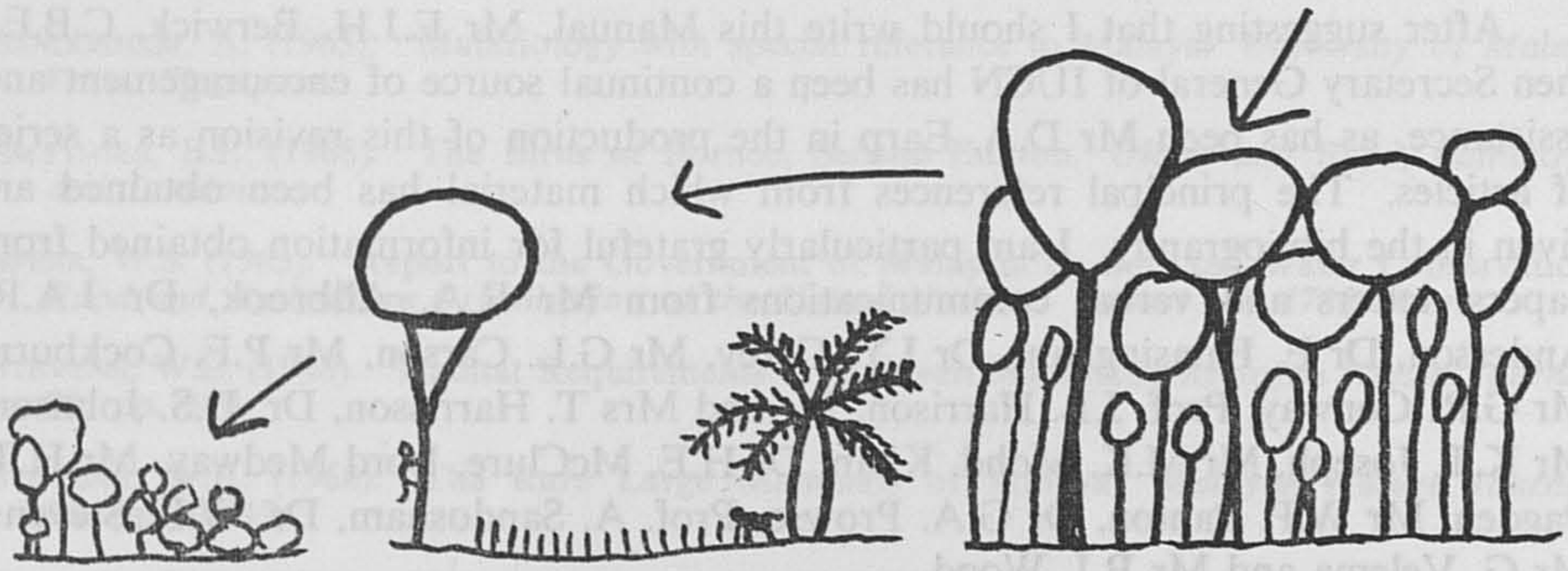
FAUNAL CHANGES WITH DISTURBANCE AND CLEARING OF FOREST

The relative proportion of the total mammal fauna typical of open conditions increases as the degree of disturbance increases, but the total number of mammal species decreases throughout this series. The fauna of the canopy is first lost, then the ground fauna is progressively replaced with the species from the open scrub.



Primary Lowland Dipterocarp Forest
Total number of Mammal Species = 76
None typical of open grassland.

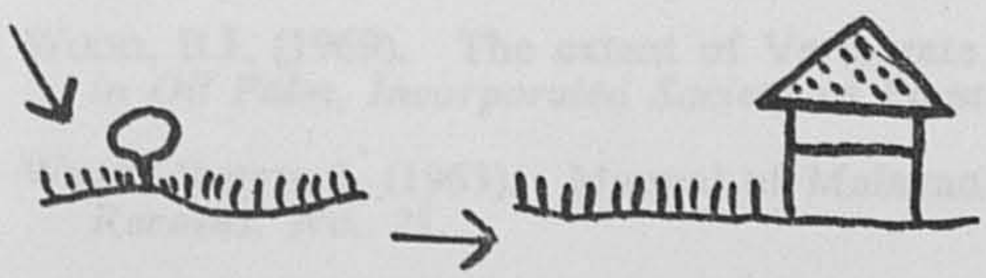
Disturbed Lowland Forest Total
No. of Mammals = 32 6% typical
of grassland.



Scrub
Total No. = 11
27% from open

Rubber and Oil Palm
Total Mammals = 13
31% from open

Secondary Forest
Total Mammals = 11
9% typical of open



Grass
Total No. = 7
43% from open

Lallang (man-made)
Total No. = 4
100% from open

The leading position of the Economic Planning Unit (Prime Minister's Department) in Land Capability Classification, its participation in the IBP, CT section and the arrangement for a Colombo Plan specialist to visit and advise on national parks and wildlife conservation in West Malaysia, are all past or present indications of favourable circumstances for the adoption of progressive proposals in these respects. Each major master plan for regional development is prepared in collaboration with the Economic Planning Unit and the instructions to the contractor preparing the master plan have included in recent cases provision to identify significant biological communities and to make recommendations for their conservation. Every sound master plan must include measures for soil and water conservation.

There is of course vigorous competition for various areas of land between rival potential uses and for the funds available to finance utilisation and conservation. Nevertheless, despite the very large areas which have been, are being, and will be converted to agriculture, there are good prospects that well prepared cases for conservation will be incorporated in the national plans. In Malaysia, as in many other parts of the world, it is not merely a question of lobbying the government to legislate measures for conservation and to vote funds for development of national parks. All who believe in the principles of conservation must assist in preparing a reasoned case and in encouraging the people as a whole to understand and implement conservation as an expression of pride in their homeland. Thereby they will hand on to future generations a heritage of beauty, interest and enjoyment in an unpolluted environment.

Acknowledgements

After suggesting that I should write this Manual, Mr E.J.H. Berwick, C.B.E., then Secretary General of IUCN has been a continual source of encouragement and assistance, as has been Mr D.A. Earp in the production of this revision as a series of articles. The principal references from which material has been obtained are given in the bibliography. I am particularly grateful for information obtained from papers, letters and verbal communications from Mr R.A. Allbrook, Dr J.A.R. Anderson, Dr E. Balasingham, Dr I.Y. Carey, Mr G.L. Carson, Mr P.F. Cockburn, Mr G.R. Conway, Prof. J.L. Harrison, Mr and Mrs T. Harrisson, Dr. D.S. Johnson, Mr K.T. Joseph, Mr M.K. Mohd. Khan, Dr H.E. McClure, Lord Medway, Mr H.T. Pagden, Mr W.P. Panton, Dr G.A. Prowse, Prof. A. Sandosham, Dr. W.E. Stevens, Mr G. Velema and Mr B.J. Wood.

BIBLIOGRAPHY

CAREY, I.Y. (1962). Methods of Cultivation among the Kelantan Temiar *Symposium on the Impact of Man on Humid Tropics Vegetation. Goroka, New Guinea, 1960, UNESCO,* pp. 207–214.

HARRISON, J.L. (1964). An Introduction to the Mammals of Sabah. *Sabah Society, Kota Kinabalu.*

HARRISON, J.L. (1966). An Introduction to the Mammals of Singapore and Malaya. *Singapore Branch, Malayan Nature Society, Singapore.*

KENNEDY, J.S. (1968). The Motivation of Integrated Control. *Journal of Applied Ecology,* pp. 492–499.

MALAYSIAN CAVES ISSUE. *Malayan Nature Journal,* **19**, part 1. (1965).

MCCLURE, H.E. (1966). Flowering, Fruiting and Animals in the Canopy of a Tropical Rain Forest. *Malayan Forester,* **29**, pp. 182–203.

MCCLURE, H.E. & HUSAIN B. HAJI OSMAN (1968). Nesting of Birds in a Coconut-Mangrove Habitat in Selangor. *Malayan Nature Journal,* **22**, pp. 18–28.

MEIJER, W. (1965). A Botanical Guide to the Flora of Mount Kinabalu. *Symposium on Ecological Research in Humid Tropics Vegetation, Kuching, Sarawak, 1963 UNESCO,* pp. 325–366.

MELLANBY, K. (1967). Pesticides and Pollution. *New Naturalist Series No. 50, Collins, London.*

MOHD. KHAN B. MOMIN KHAN (1968). Deer Biological Data, 1967. *Malayan Nature Journal* **21**, pp. 159–164.

PANTON, W.P. (1963). Topography, Geology and Soils. *Malayan Forest Records No. 23,* Part II, Chapter 2.

PROWSE, G.A. (1968). Pollution in Malayan Waters. *Malayan Nature Journal* **21**, pp. 149–158.

SANDOSHAM, A. (1965). Malariology with special reference to Malaya. *University of Malaya Press, Singapore.*

SMYTHIES, B.E. (1968). The Birds of Borneo, Second Edition. *Oliver and Boyd, Edinburgh and London.*

SPEER, W.S. (1963). Report to the Government of Malaysia on Soil and Water Conservation. *Food and Agriculture Organisation of the United Nations. Report No. 1788, Rome.*

STEVENS, W.E. (1968). Habitat Requirements of Malayan Mammals. *Malayan Nature Journal,* **22**, pp. 3–9.

STEVENS, W.E. (1968). The Rare Large Mammals of Malaya. *Malayan Nature Journal,* **22**, pp. 10–17.

STEVENS, W.E. (1968). The Conservation of Wildlife in West Malaysia. *Ministry of Lands and Mines, Seremban, Malaysia.*

TALBOT, L.M. & M.H. EDS. (1968). *Conservation in Tropical South East Asia. IUCN Pub. New Series No. 10—Morges, Switzerland.*

WOOD, B.J. (1969). The extent of Vertebrate Attacks on the Oil Palm in Malaysia. *Progress in Oil Palm, Incorporated Society of Planters, Kuala Lumpur,* pp. 162–184.

WYATT-SMITH, J. (1963). Manual of Malayan Silviculture for Inland Forests. *Malayan Forest Records, No. 23.*

WYATT-SMITH, J. & WYCHERLEY, P.R. EDS. (1961). Nature Conservation in Western Malaysia, 1961. *Malayan Nature Journal, Special Issue.*

WYCHERLEY, P.R. (1967). Rainfall Probability Tables for Malaysia. *Rubb. Res. Inst. Plant. Manual 12.*

Holden The Great Way to Move

Approved nett selling price, including all govt. taxes, M$ 11,949.

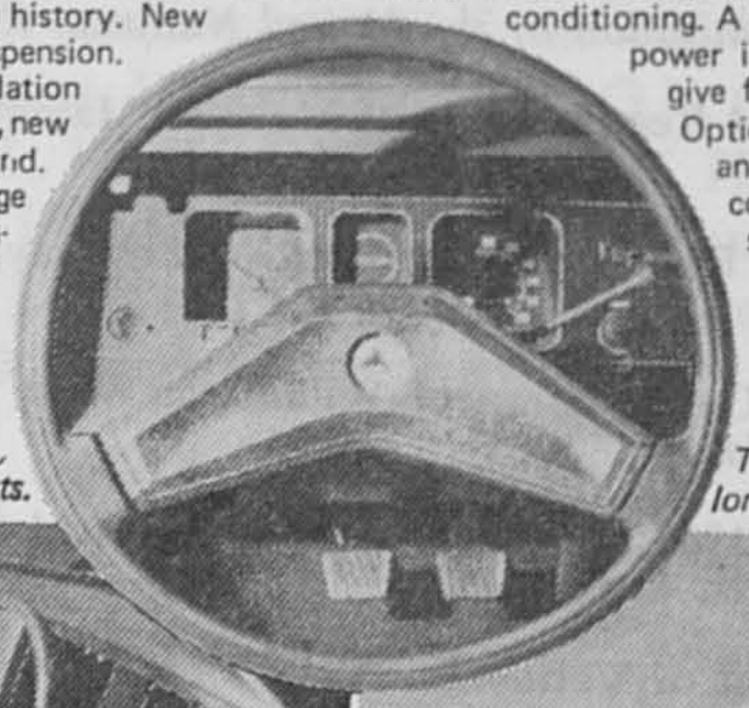


"Sydney Sun" Road Test reports on fuel consumption

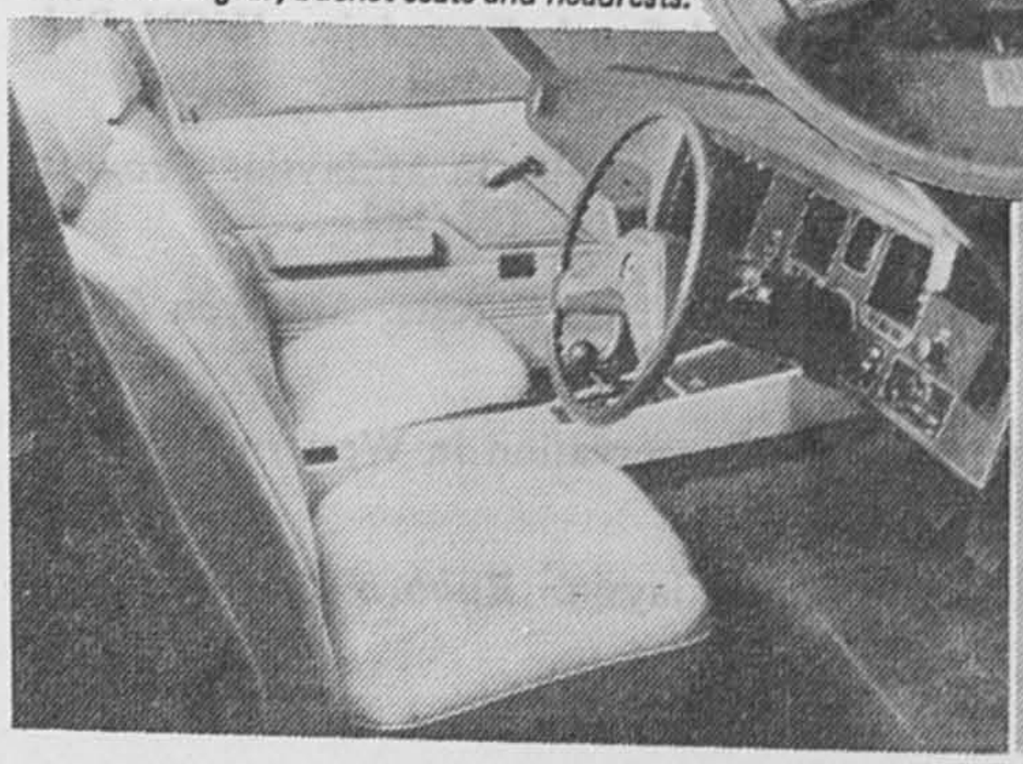
Highway driving 28 m.p.g.
Economy driving (50 m.p.h.) 30 m.p.g.

See it at:
LYONS MOTORS, K.L., Petaling Jaya, Klang and Ipoh or
WEARNE, Penang, Butterworth, Kuantan, Seremban, Malacca, Johore Bahru.

The new Holdens have already changed Australia's ideas about how a good car should look. Drive one . . . and you'll change your ideas about how a great car should ride. A five foot wide track and new big coil springs over each wheel see to that . . . but these are only two changes in the most changed Holdens in history. New styling. New front chassis design. New suspension. New seating comfort. New flow-thru ventilation system. New steering. New brakes. Exciting, new Kingswood, built with your family in mind. Luxurious new Monaro LS model for prestige two-door motoring. Australia's first long-wheelbase wagons. You've got to drive new Holden to believe it . . . and we've got them ready, waiting for you to do just that. Do it today. The superb Premier range offers luxurious fold-flat bucket seats with folding arm rests front and rear, and superb fully instrumented walnut facia, with built-in, forced-flow ventilation and concealed air conditioning. A smooth six-cylinder engine provides ample power in silky silence, while power disc brakes give fade-free, safe stopping from high speeds. Optional power steering completes your comfort and safety. And finally a choice of a 3-speed column gearchange, full automatic transmission, or the sporty, 4-speed console shift, with new manual gear-box that allows optimum gear ratios, maximum reliability.



The superb new Kingswood with 4-speed floor console gear, bucket seats and headrests.

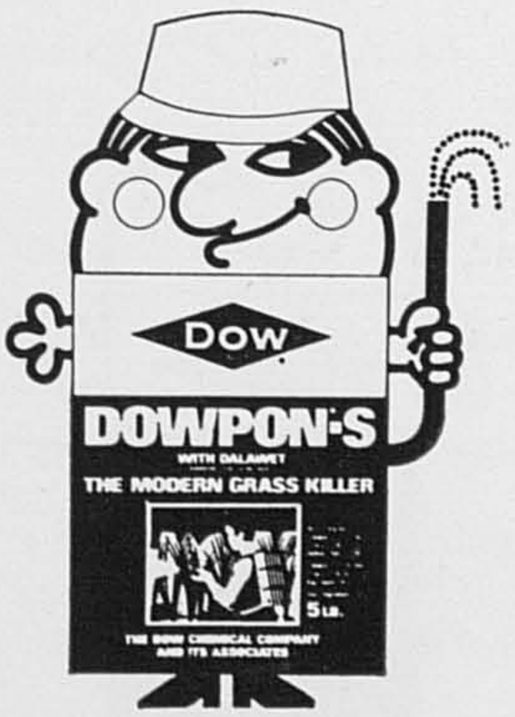


The big new Kingswood station wagon with long wheel base — an exclusive chassis design.



DOWPON–S
the effective lalang killer

DOWPON-S is the quick complete 14 days cure for lalang headaches. DOWPON-S, containing Dow's exclusive Dalawet penetrating agent, attacks the lalang roots, killing it completely. Easily applied by spraying or wiping after mixing with water, swift and economical



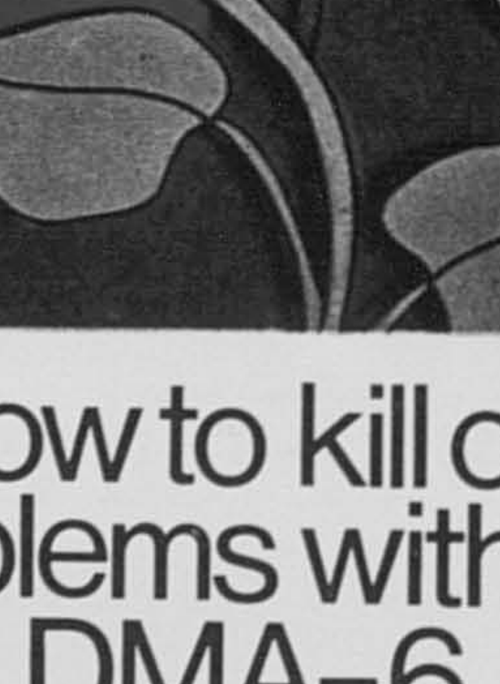
DOW*

DOWPON-S, is only one of Dow's solutions to your agricultural problems. Dow specialises in agricultural science and every product is the result of years of research. So when you're faced with a weed problem, consult the Dr. from Dow. He has the solution.

*Trademark of the Dow Chemical Company.

How to kill off all weed problems with one solution DMA-6

DMA-6 from Dow. No matter what your problem is, broad leaf weeds, hairy or woody stemmed weeds, a mixture of weeds of all shapes and sizes, even tough and hardy grasses, DMA-6 kills them all, completely. For selective weed control, just mix DMA-6 with water. It will kill off broad-leaf, hairy and woody stemmed weeds. A dose of DMA-6 with Sodium Chlorate, Lissapol and water gives you total weed control over a mixed company of weeds, while



DOW*

DMA-6 with DOWPON-S, MSMA 529 and water is fatal to tough and hardy grasses. Just spray on the foliage and watch your problem wither away. DMA-6 is non-poisonous and non-toxic to your crops and animals. And a hint from the doctor from Dow. For economical application use either the 5 or 55 US gallon drum of DMA-6. DMA-6, another example of Dow's commitment to making your profit grow through agricultural science.

*Trademark of the Dow Chemical Company.

GLOSSARY

(Most technical words and phrases are defined where they first occur in the text, but the more frequently used terms and some which have given difficulty are included for easy reference in this glossary, which cannot be exhaustive for all matters relating to conservation and allied topics.)

ADAPTATION. A change in a living organism which enables it to function more efficiently or improves its chances of survival in a particular environment. Adaptations may be physiological, temporary and limited to the individuals exposed to a change in environment or may become genetically fixed, of evolutionary significance and characteristic of populations such as races, varieties, species or larger groups.

ADVECTION. Horizontal movement of air and associated lateral transmission of heat.

ALGAE. Simple plants lacking vascular tissues. Sometimes each individual consists of one cell only. The reproductive organs consist of one cell only in the forms with many cells in each individual plant. They carry out photosynthesis although the green pigment chlorophyll may be obscured by others of different colours. Most occur in damp or aquatic habitats, the marine algae are called seaweeds.

ALIEN. A species which is not native in the area or country concerned, but has its natural range of distribution elsewhere, whence it has been deliberately introduced or accidentally carried.

ALLUVIUM. Material transported by water to the site where it is deposited and develops into soil.

AMINO-ACID. An organic compound with a basic amino group (NH2), which in all naturally occurring amino-acids is attached to the carbon atom adjacent to the acidic carboxyl group (COOH), another group forms the remainder of the compound. Amino-acids are joined together in chains to form proteins. Green plants can make all the necessary amino-acids, but most animals must be supplied with several amino-acids ready made.

ANNUAL. In the temperate regions, an annual plant means one which germinates, grows, flowers, fruits and dies all in less than a year. The essential feature is that it dies after setting seed, which holds true in the tropics also, although the life cycle is often very short and sometimes— in rather few cases—very long as in the so-called Century Palm. *See* MONOCARPIC.

ANTIBIOTIC. A substance secreted by a living organism which inhibits the growth of—sometimes killing—other kinds of organisms. In many well known medical examples the antibiotics are produced by fungi and suppress bacteria.

AQUARIST. A person who maintains an aquarium, which is a glass tank or similar enclosure, in order to keep aquatic animals (those which live in waters in captivity).

ARID. Very dry owing to inadequacy of rain; in contrast to humid conditions such as those which prevail in Malaysia.

ARTIFICIAL. Made or applied by man, not by nature, for example artificial fertilisers or manures are mineral nutrients quarried or manufactured and added to the soil.

ASSIMILATE. To take simple nutrients into an organism and build them into more complex substances. Used as a noun to mean the substances assimilated, especially the products of carbon assimilation by photosynthesis.

AVIFAUNA. The bird population of a locality or region.

BACTERIA. Microscopic living organisms, each consisting of one cell only. A few bacteria can carry out photosynthesis by means of a pigment somewhat different from the chlorophyll of green plants. Most bacteria must obtain their energy from other sources by decomposing organic matter or as parasites of other organisms, especially as the causes of diseases in animals. Some are important in the fixation and circulation of nitrogen in the soil.

BAGWORMS. The larvae of moths which encase themselves with plant and soil debris, thus perhaps affording some protection against contact insecticides. Bagworms are normally controlled by natural predators and parasites, but these are more susceptible to contact insecticides than the bagworms.

BAMBOO. Members of the grass family with woody stems. Most are large in size compared with other grasses, but not as tall as forest trees. Bamboos may establish local dominance by forming dense thickets, from whose edges new shoots extend rapidly to shade out tree seedlings. The young shoots of some bamboos are edible.

BASALT. An igneous rock formed by the solidification of volcanic lava, relatively rare in Malaysia.

BELUKAR. A Malay word referring to secondary vegetation of mainly woody plants, shrubs, trees and lianes. *Belukar* is not as tall as primary forest and usually contains few timber trees of commercial value. The undergrowth in *belukar* is often very dense, especially at the edges where light penetrates obliquely almost to the ground. It is *belukar* in such circumstances—rather than primary forest—which has earned the reputation of "impenetrable jungle" where "paths are overgrown again overnight" at least as far as the non-swamp vegetation of the humid tropics is concerned.

BIOTIC. Of or due to living organisms, especially to indicate those factors in the environment or ecosystem due to the effects of the living organisms present. Human activity is one of the most powerful biotic influences; the significant natural biotic factors include micro-organisms in the soil, the vegetation, grazing animals, predators and parasites. *See* CLIMAX.

BIRD BANDING. The American usage for bird ringing as it is called in England. A light metal band embossed with a number and return address is fixed around the bird's leg. A band of the correct size moves freely without hurting the bird. Banding of nestlings is possible because the lower part of a bird's leg does not increase in thickness after fledging. The details of the bird are recorded against the band number. Bird banding is a fascinating hobby. All interested should learn how to handle and identify the birds and to apply the bands correctly. Bands can only be obtained from the proper authorities in each country, which are seldom government departments, where training is also available. All bands found in Malaysia may be sent to the Malayan Nature Society, P O Box 750, Kuala Lumpur, giving details of how and where the bird bearing it was found.

BOUNDARY RAIN. Precipitation caused by the uplift of moisture-laden air where wind streams impinge upon each other or against a stationary mass of air.

BRACKISH. Of water salt to the taste yet with a lower content of salt than that in seawater, brackish water is usually formed by a mingling of fresh and seawater, but may arise from salt springs.

CARBOHYDRATE. Compounds consisting of carbon, hydrogen and oxygen only, the last being in the same ratio as in water, general formula Cx(H20)y. Sugars,

starch and cellulose are well-known examples. Cellulose is the main structural material in plant cell-walls. Cellulose is broken down by bacteria in the soil and in the rumen and blind-gut of some mammals. Carbohydrates, especially starch and sugars, are among the most common sources of energy in the food of animals and the metabolism of all living organisms.

CARNIVORE. An animal (also a very few plants) which feeds on flesh, especially members of the Carnivora, an order of mammals whose teeth are adapted to eating flesh including the bears, cats, civets, dogs, otters, weasels and allies.

CAVE. A hollow space underground formed by a rockfall or by erosion. Some naturalists restrict the definition to those caves with access for wildlife. Most, but not all, caves in Malaysia have been hollowed out in limestone formations by the action of water and dissolved carbon dioxide.

CHLOROPHYLL. A green pigment found in most plants, which enables light energy to be trapped and made available for photosynthesis. Several forms of chlorophyll are known, they are compounds of carbon, hydrogen, magnesium, nitrogen and oxygen.

CLIMATIC. Of or due to the weather conditions throughout the year, especially to indicate those factors contributing to the environment or eco-system arising from the intensity of or variation in meteorological conditions. *See* CLIMAX.

CLIMAX. The type of vegetation which would finally cover a particular area after sufficient time (sometimes as much as centuries) to attain a stable composition in equilibrium with the environmental factors, that is the typical natural vegetation in the undisturbed condition. The climax for a large area such as a whole country, or a region sharing similar climatic conditions, is called the climatic climax, because it is determined mainly by the climate, *e.g.* Rain Forest throughout Malaysia. However, locally soil conditions such as poor drainage in swamps or lack of fertility on heaths prevent the full development of the climatic or regional climax, and the climax obtained is called an edaphic climax, because the soil is the main limiting factor. The attainment of the climatic climax may be prevented or it may be converted into another type of vegetation and maintained in this condition by the activity of animals, including man and his specialised ways of interfering with the environment such as spreading fires and in recent times pollution. A climax due to animals, for example over-grazing following the loss of predators, is called a biotic climax. The climax resulting from repeated burning is sometimes called a fire climax, but it is also an example of a biotic climax.

COLLAR. The portion of a tree where the root and shoot join at approximately ground level mentioned in the discussion of root disease.

COLLUVIAL. Soil developed by the mixing together of material washed or fallen down to the foot of a slope with material weathered on site.

COMMUNITY. A general term in ecology to indicate different species living together in the same place affecting each other by their mutual relationships. A community may be a unit in a larger community. A community may be independent of adjacent communities or be linked with them. Some ecologists define different types of communities and classify them using special terms for the units at different levels.

CONDENSATION. The change of a substance from the vapour state to the liquid, especially of water vapour into water drops.

73 SIN 4

[Remember the days?]

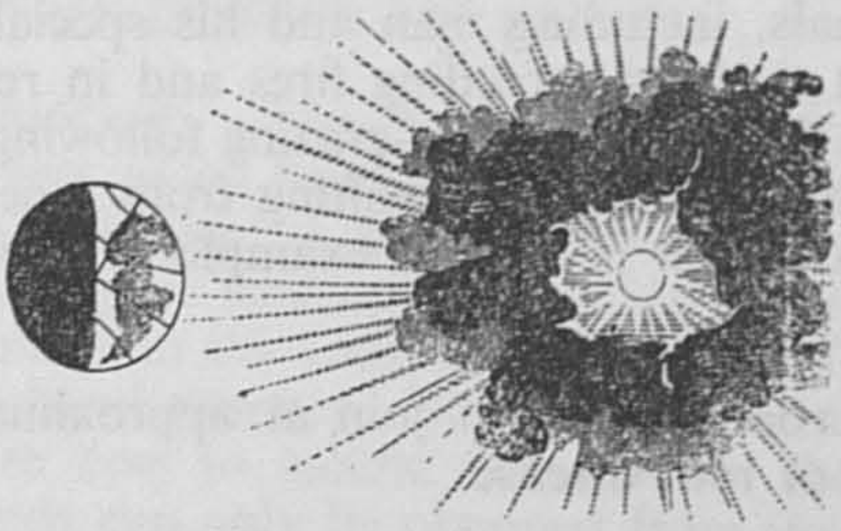


From *Peter Parley's Tales about the Sun, Moon, and Stars* (1830).

Want to head straight for Europe, or shall we pick you up at Bangkok?

AS YOU MAY KNOW, we can take you direct to the heart of Europe (Zurich or Geneva, where else?) any Wednesday morning; the sun never sets on your journey. (You may drop by in Ceylon if your mind is on emeralds.)

On Mondays, down your Singapore sling and take off before dinner. Cocktail to cockcrow, as we say. This puts you in Zurich bright and early for connections to any of the 60-odd European, African, North and South American destinations we serve.



Sun shining on the Earth, Day and Night.

(Incidentally, we'll carry you from Switzerland to the European capital of your choice about as quickly as you'd get from one side of Singapore to the other—Paris an hour; Rome an hour and a quarter; London 90 minutes.)

If you decide to join us at Bangkok, we fly to Europe from there six days a week (ditto eastward; think of what you might do in Hong Kong, Manila, and Tokyo).

Our particular part of Europe, the piece that has won us the nickname of "Alp-air"—Munich to Milan, Nice to Vienna—, is the subject of 12 full-colour brochures we've got up, listing scores of things to do from summer skiing and river cruises to chalets for rent and château tours. Ask us or your IATA travel agent for an "Alpine Highlife" kit.

SWISSAIR

Swissair, Hotel Merlin, Jalan Treacher, Kuala Lumpur
Telephone 27386/7

☞ If I had your timetables I could decide between flying direct and joining you at Bangkok.
☞ How about the "Alpine Highlife" colour brochures?

CONE-SHELL. The beautiful and much sought-after shell of *Conus* and related marine gasteropod molluscs.

CONTOUR. A line drawn on a map or which may be traced on the ground to join points of equal height above sea level. A path, terrace, ditch or siltpit which follows the contour is therefore level.

CONVECTION. The vertical movement of air (or other fluids) and the associated upward transmission of heat. (*See* INSTABILITY RAIN)

CORAL. The rocky mass formed from the calcareous external skeletons of colonies of simple animals (Coelenterates) and/or the animals themselves. Coral forms only in shallow, warm seas where the fringing reefs are an important habitat and protection of the coast.

COVER. An aspect of an animal's habitat, which it requires for a particular function, *e.g.* feeding, drinking, sleeping, breeding, raising young, sheltering from adverse conditions or predators. A simple type of cover may suffice for all activities of some animals and provide their whole habitat. Most large mammals need a habitat with several types of cover. Migrants have different cover requirements in different places at different seasons.

CULL. To pick out, especially to select for removal or destruction, to kill particular individuals from a population, to eliminate unhealthy or over-aged surplus stock.

DERIVATIVE. Of communities and vegetation which have been derived from the climatic climax by modification of the habitat usually through biotic factors.

DETERGENT. A dissolved agent which detaches contaminants (dirt, fungal parasites, etc.) from the solid substratum (article to be cleaned, host tissues, etc.) by modification of their respective surface properties without dissolving the contaminant. Detergents are used in domestic and industrial cleaning, some pesticides contain detergents; large amounts of cleaning detergents in rivers can lead to eutrophism, excessive froth due to lowered surface tension and damage to some organisms.

DEW. Water drops condensed on the surface of plants, the soil and other terrestrial objects.

DIPTEROCARP. A tree of the family Dipterocarpaceae, named after the type genus *Dipterocarpus* which has two-winged fruits, although other members of the family have different numbers of wings on the fruit. Many Dipterocarpaceous trees yield commercially valuable timber, although much Malaysian timber comes from trees of other families. Dipterocarp forest refers to forest in which Dipterocarp trees constitute a larger proportion of the timber and/or the tall, emergent trees over-topping the rest than do those of any other single family.

DISPLAY. Animals, especially birds, showing striking features with appropriate movements and sometimes sounds to convey messages concerning courtship, protection of territory, etc., to members of the same species.

ECOLOGY. Study of the relationships of living organisms (animals and plants) with each other and with their environment, especially the study of natural communities. Popularly a catchword or slogan to indicate the need for a beneficial relationship between mankind and the environment on earth, including prevention of pollution, conservation and recycling of natural resources and restraint of over-population.

ECOSYSTEM. A recognisable, self-sufficient biological community characterised by the vegetation and associated animal population arising in the particular environment. An ecosystem consists of the habitat and the living organisms it supports. The main factors contributing to an ecosystem are classified as biotic, climatic and edaphic.

EDAPHIC. Of or due to the soil, its biological, chemical, physical and topographical features, especially those factors in the ecosystem or the environment attributable to the soil. The biological features of the soii, mainly the micro-organisms living in the soil, are largely determined by its chemical and physical characteristics including aeration and drainage, also by the vegetation and the climate, for instance the rainfall and temperature. The biological features of the soil may be considered as biotic and/or edaphic. Thus fine, absolute classification is impracticable because all factors interact.

ENCEPHALITIS. Inflammation of the brain.

ENDEMIC. Of plant and animal species whose natural distribution is limited to a particular area, for instance a country, a hill or an island, possibly the place of origin. Also of diseases which occur repeatedly in a particular area, although not necessarily the place of origin.

ENTERITIS. Inflammation of the intestines.

ENVIRONMENT. The conditions surrounding an organism, especially the external physical, chemical and biological circumstances in which it lives. (The internal environment refers to the conditions of the fluids surrounding individual cells and organelles within an organism, which is an important concept in physiology; it does not directly concern conservation and ecology).

ENZYME. A protein which acts as a catalyst, that is it speeds up greatly certain chemical reactions although it is only present itself in very small amounts. Enzymes are made only by living organisms.

EPIDEMIC. Of a disease caused by a parasite, which shows a very rapid increase in the number of cases.

EPIPHYTE. A plant which uses another as a support without drawing any nutrients from the latter's living tissues and without contact with the ground. An epiphyte may be contrasted with a parasite, which obtains nutrients from its host, and with a climber which is rooted in the soil.

EQUATORIAL. Of the region about the equator and of the typical climate and vegetation prevailing there. Characterised by rainfall in excess of evaporation, lack of marked seasonal variation such as a long dry spell and by high temperatures in which diurnal variation exceeds seasonal; rain forest is the typical vegetation or climax in the lowlands. Most of Malaysia is equatorial in this sense; the equatorial belt lies within 5 to 10 degrees on either side of the equator.

EQUINOX. When the sun is vertically overhead at noon at the equator and the day and night are both 12 hours long everywhere throughout the world. The first equinox each year falls about 21 March and the second about 22 September, these are called respectively the spring or vernal and the autumnal equinoxes following the usage established in the northern temperate region.

EROSION. The act of wearing away material or the condition of being worn away, especially the wearing away of rock and soil by water and wind including abrasive particles carried by them.

ESCAPE. An alien which has run wild after introduction for rearing in captivity or by cultivation.

ESTUARINE. Of an estuary, which is the mouth of a river where tidal influences are felt and at least some saltwater penetrates.

EUTROPHIC. Of waters rich in dissolved mineral nutrients and highly productive of organic matter; a state of excessive eutrophism may lead to exhaustion of the dissolved oxygen.

EVOLUTION. The process of new forms of living organisms arising by gradual change through successive generations so that species, which now differ, are descended from common ancestors. Genetic mutations and recombinations produce forms adapted to survive better, especially if there are concomitant changes in the environment. Evolution by natural selection resulting in the survival of the fittest or best adapted was propounded in 1858 by Charles Darwin and Alfred Russel Wallace, the latter formulated his views while studying wildlife in the Malay Archipelago including East Malaysia.

EXOTIC. Alien (popularly exotic is reserved for the more bizarre aliens or indeed anything out of the ordinary, but any foreign species is exotic, whereas natives are not).

FAUNA. The animal population present in a particular place or during a given period on the geological time scale.

FERN. Spore-bearing, vascular green plants usually in damper habitats.

FISH-TAGGING. A method of marking fish to study their movements and longevity, primarily a tool for research in fisheries and migration, but it may become a scientific hobby for skin-divers in a parallel manner to the enlistment of amateur ornithologists as bird-banders.

FLORA. The plant population present in a particular place or during a given geological period. As well as referring to the plants themselves, a flora may indicate species lists or manuals for the identification of the plants in a country.

The Flora Malesiana Foundation is preparing a series of volumes to describe the flora of the Malesian region, which includes Malaysia.

GAME. Animals hunted or pursued for sport. Game animals are legally defined in the appropriate legislation.

GENETIC. Due to heredity, the transmission of characters from one generation to the next.

GILLS. The respiratory organs of aquatic animals, gills have a large surface area due to many folds; dissolved gases and other substances diffuse across the fine membranes separating the external water and the many internal blood vessels.

GREEN PLANTS. Plants containing chlorophyll and able to carry out photosynthesis.

HABITAT. The place where an organism lives, its environment, habitat may include several aspects or the complete types of cover.

HERBICIDE. A chemical which kills plants, especially those considered to be weeds, restricted by some to non-woody species.

HERBIVORE. An animal which eats plants.

Qantas is the Airline for people who can't wait to get to Australia

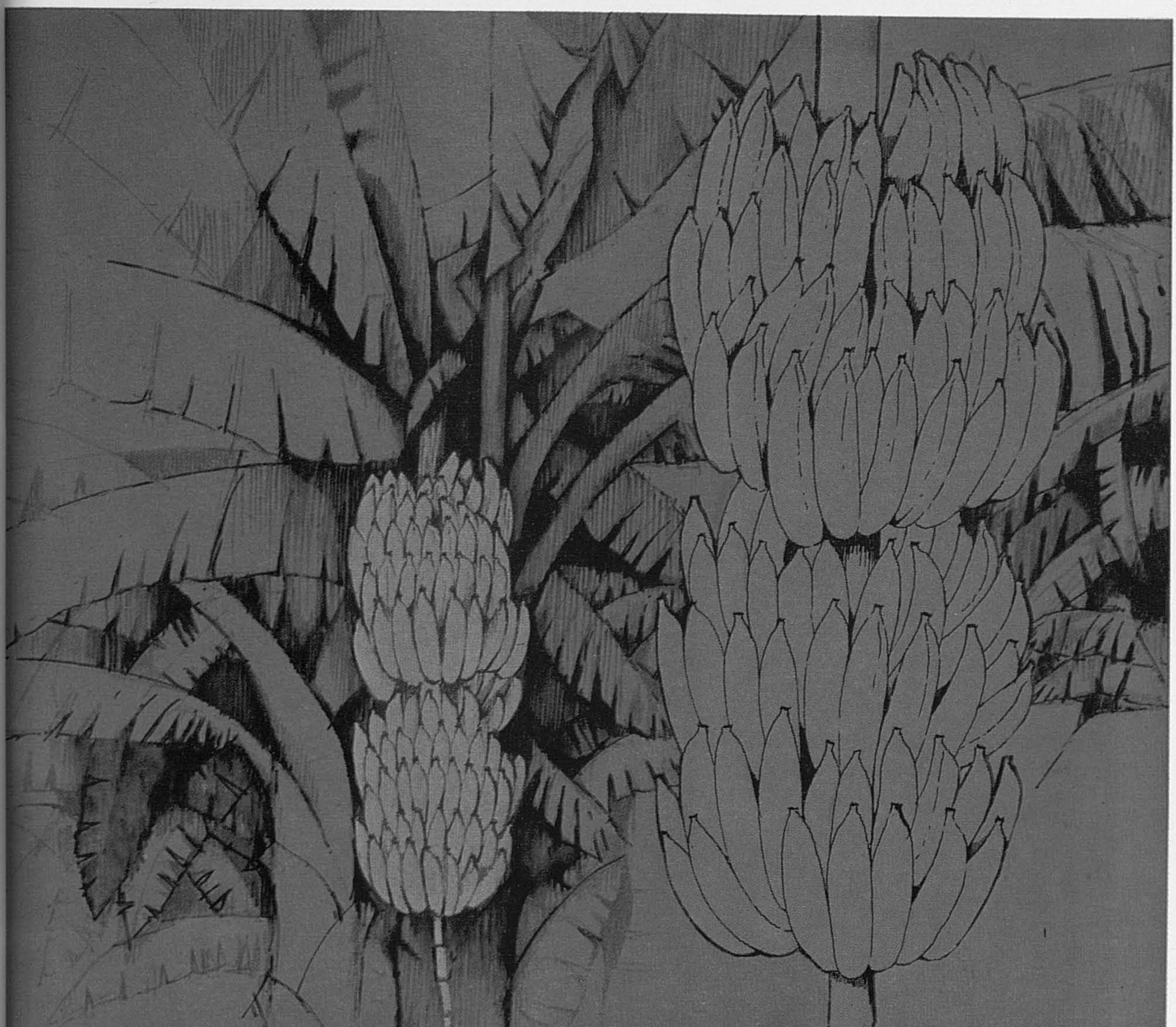
New Zealand, Fiji and the South Pacific.

Fastest flights! So that you can beat the world to Australia.
Qantas gets you there when you want to go and in comfort.
Over the last 50 years Qantas learned more
about comfortable long-distance flying than anyone else. Had to.
Qantas flies the world from a country thousands and thousands
of miles from anywhere. Australia's the place.
Qantas is the airline. How soon can you be ready?



QANTAS
Australia's Overseas Airline

In Association with Air New Zealand, B.O.A.C. and S.I.A.



Nitrophoska

or further information please contact:

ole Importers

bm

EHN MEYER

NGAPORE. KUALA LUMPUR. IPOH. PENANG.

itrophoska — complex fertilizers

There are many complex fertilizers
but only one Nitrophoska.

BASF

UF/Dü 2801

KILLERS



bm
BEHN MEYER
SINGAPORE KUALA LUMPUR PENANG IPOH

HIDE. A structure to conceal an observer, photographer or hunter of wild animals from them, sometimes a 'blind' in American usage.

HUMUS. Decaying organic matter, mainly of plant origin, in the soil.

IGNEOUS. Of rocks formed by solidification of molten material.

IMPRINTING. A form of learning in animals, usually early in life, whereby the manner in which a particular action is first carried out or in which a particular stimulus is first presented, determines the future response in a situation concerned with that action or stimulus. If all young animals of a given species share the same experience, they all become imprinted in the same way, so that the response becomes the behaviour characteristic of the species. The ability to be imprinted is inherited, but the resultant behaviour is not inherited or instinctive. Animals may be abnormally imprinted by exceptional experience giving rise to atypical responses and behaviour. Learning by imprinting is stable and difficult to unlearn or modify.

INFILTRATION. The entry of water into the soil through pores, instead of running off over the surface.

INSECTICIDE. A chemical to kill insects, especially those which are pests or transmit disease. Insects are invertebrate animals with jointed bodies, typically three pairs of legs in the adult and a hard external skeleton. Insecticides are poisons and their action cannot be confined to harmful pests and insects alone, instructions to reduce risks to operators, domestic animals and wildlife should be carefully followed.

INSTABILITY RAIN. Due to surface heating and convection currents moisture laden air continues upward into cool air where condensation into rain occurs often as thunderstorms.

INSTINCT. Specific behaviour pattern which is an inherited response to stimuli, not learned.

INTRODUCTIONS. Aliens deliberately imported and allowed or encouraged to run wild.

INTRUSION. Igneous rock which solidified before reaching the earth's surface, often located between other formations.

INVERTEBRATE. An animal without a backbone, that which is not a vertebrate.

KARST. A type of limestone landscape in which drainage of water through the rock has produced dissected, steep sided hills, often riddled with hollows and caves, with thin infertile soil.

LAC INSECTS. Of the family Coccidae, which includes also scale insects and mealy bugs, most are pests of crop plants although seldom very damaging: the true lac-insect *Coccus lacca* produces shellac and cochineal in India.

LALLANG. The Malay name for the grass *Imperata cylindrica* and for areas dominated by almost pure stands of this grass, which may establish a biotic fire climax.

LARVA. A young, active stage of an animal which differs distinctly in form from the adult.

LEARNING. Process by which an animal comes to behave in response to stimuli as a result of its past experience.

LEGUME. The bivalved fruit pod characteristic of the family Leguminosae; popularly any plant in this family, *e.g.* beans, peacock flowers and rain trees. Many, but by no means all, leguminous plants have in nodules on their roots symbiotic bacteria able to fix atmospheric nitrogen. This is known in plants of other families also.

LEPTOSPIROSIS. A tropical fever due to infection by leptospirochaetes, usually considered to be bacteria but classified by some as protozoa (primitive, one-celled animals).

LIANA. Woody climbing plant.

LIMESTONE. A rock consisting of at least half calcium carbonate, the remainder often being magnesium carbonate with smaller amounts of siliceous and other mineral matter. Usually formed by sedimentation of calcareous animal shells or from coral.

LITTORAL. Strictly the seashore between high and low tide levels; also the land and sea adjacent to this zone.

MALARIA. Fevers caused by infection with protozoa called *Plasmodium.* Areas, where the disease is endemic, and the *Anopheles* mosquitos, which transmit it occur, are sometimes called malarial.

MANAGEMENT. Refers in conservation to the modification of the habitat or treatment of the wildlife in order to promote heavier stocking or the survival of particular species.

MEALY BUG. A scale insect of the Coccidae which has a mealy or waxy covering, sometimes pests of crops.

METABOLISMS. The chemical processes of a living organism.

METAMORPHOSIS. Change of form. In animals from larva to adult for example. Of rocks altered by great heat or pressure (occasionally by solution and recrystallisation).

MIGRANT. An animal which migrates, that is members of the species move regularly and systematically between two (or more) definite, separate areas. For example, the annual movements of birds such as the Siberian Thrush and Blue Robin which breed in central Asia and winter in Malaysia, or the regular spawning runs up the great rivers of Malaya of the Giant Cyprinid fish.

MITES. Invertebrate animals related to the spiders, some are parasites.

MONOCARPIC. Plants which flower and fruit once only and then die irrespective of their lifespan in years.

MONSOON. Seasonal winds, whose prevalent direction depends on the time of year, affecting very extensive areas between the tropics. Of the climate and vegetation characteristic of these regions where the seasonal monsoon-born rains alternate with dry spells.

MOSQUITO. Insect with aquatic larvae, the female adults are blood-sucking and transmit a wide range of diseases.

MOSS. Common name for Musci; green plants reproducing by spores from sex organs consisting of many cells lacking highly differentiated vascular tissue, found in damp places.

MOTH. Insects with two pairs of wings and feathery antennae, adults often feed on nectar and larvae on plants or organic remains.

MULCH. Material, often vegetable matter, laid over the soil.

MUTATION. A sudden change in a hereditary factor, which may be transmitted to the next generation and become expressed as a change in the colour, structure, function or behaviour of the living organism.

NATIVE. Born in a country, naturally occurring there, not introduced.

NATURAL. Of vegetation which has not been modified by man or animals under human control.

NEMATODE. Roundworm, unsegmented, pointed at both ends. Some nematodes are free-living in soil or water, many are parasites of crop plants and animals, especially of vertebrates; most are minute but a few gut parasites of mammals are fairly large.

NICHE. A habitat of limited extent or occurrence, because it is dependent on an exceptional combination of factors to which few species are well adapted; niche is less commonly used in ecological writings today.

NITROGEN FIXATION. Formation of organic compounds of nitrogen using the atmospheric gas the source by the agency of blue-green algae or of bacteria, either free-living in the soil or symbiotic with green flowering plants (*e.g.* many Leguminosae).

NUCLEIC ACID. A large chain of nucleotides, each of which consists of three components, namely a sugar with 5 carbon atoms, phosphoric acid and a base containing nitrogen. DNA (Deoxyribonucleic acid) has 2-desoxy-D-ribose as the sugar with thymine, cystoscine, adenine and guanine as the bases. RNA (Ribonucleic acid) has ribose as sugar and uracil instead of thymine with the other 3 bases. DNA transfers genetic information from one generation of cells or of individual living organisms to the next. RNA translate the information of the DNA into enzymes to effect it in the metabolism and development of the cell or organism.

NUCLEUS. In a cell of a living organism, a body containing most of the genetic material inherited from the previous generation, which can be stained characteristically. In rain formation, the small particles about which conensation takes place.

NUTRITION. The provision of food to living organisms, simple substances to green plants but more complex compounds to animals. Balanced nutrition means that the nutrients are supplied in approximately the same proportions as they are required, whereas deficits or excesses of one or more nutrients indicate unbalance.

OIL PALM. *Elaeis guineensis.* A palm introduced from West Africa to Malaysia, from whose fruit oil is expressed, the acreage planted with oil palm in Malaysia has increased greatly since 1960.

ORCHID. A plant of the family Orchidaceae, characterised by laterally symmetrical flowers, several of whose parts are strongly modified especially as adaptations to ensure cross pollination by particular insects. The pollen is in sticky masses. The seeds are very small like powder. Many orchids are tolerant of temporary drought. The orchids are a very popular group with horticulturalists because of the striking colours and forms of many, some are scented; few have any use except as ornamentals, the best known exception yields vanilla, but it is not native in Malaysia.

David Brown
(1210 Synchromesh)
living up to its name



The David Brown 1210 Synchromesh agricultural tractor is the newest member of the David Brown family. A name that's synonymous with quality and reliability. And the David Brown 1210 Synchromesh is certainly living up to its name. It's the first and only tractor in the world that has a 12 forward speed gearbox, with synchromesh on 8 of the 12 forward gears. This unique feature enables fast gear changes with the greatest of ease. As a result, you cut down on idle time. And every David Brown that's sold is backed up by UMW service and expertise. Service and expertise that's acquired from years of experience in the agricultural and industrial equipment business. From UMW's computer-controlled spare-parts division, you can get all the parts that you want, whenever you want them. And UMW's famous fleet of more than 90, 24-hour mobile service jeeps, ensures you get fast, efficient service. Come in and test-out the David Brown 1210 Synchromesh agricultural tractor. It could be the start of a profitable year for you.

UMW gives you the service—plus the expertise

UNITED MOTOR WORKS

SHAH ALAM ▪ SINGAPORE ▪ PENANG ▪ KOTA KINABALU

Jurong • Orchard Road • Alor Star • Sungei Patani • Ipoh • Segamat • Malacca • Kluang • Kota Bahru
Kuala Krai • Kuala Trengganu • Gua Musang • Kuantan • Temerloh • Sandakan • Miri • Kuching • Tawau

PANEL. Of a rubber tree, the part of the trunk which is tapped, the exposure of the inner bark tissues renders them liable to infection.

PARASITE. A living organism which obtains its nutrients from the living tissues of another living organism, the latter is known as the host. An obligate parasite has no other way of nutrition, a facultative parasite has alternative method for instance as a saprophyte, a partial parasite obtains part of its food only from its host.

PATHOGEN. A parasite which causes disease.

PEAT. Soil consisting entirely of plant remains, usually formed under water-logged conditions, but sometimes where mineral nutrients are in very limited availability, peat formation is most rapid under very wet, infertile conditions.

PERENNIAL. A plant which grows for many years and flowers and fruits several times during its life.

PESTICIDE. A chemical to kill unwanted living things whether plant or animal.

PHOTOSYNTHESIS. The synthesis of carbohydrates from water and carbon dioxide by plants using the energy of sunlight absorbed by the green pigment chlorophyll.

PHYTOGEOGRAPHIC. Of the distribution and range of plants through the world.

PIONEER. Of the first vegetation colonising a bare area at the beginning of a succession.

PLANKTON. The floating or drifting flora and fauna of lakes and the sea, usually individually microscopic living organisms.

PODSOL. A heavily leached type of infertile soil with a thin covering of organic matter, a deep profile of almost pure siliceous material, usually grey-white sand, and a hardpan of accumulated iron and other compounds beneath.

POLLUTION. The act, state or material of defilement, especially the poisoning of the environment so that it is less suitable or quite unfit to support life. Water and air are most susceptible to pollution. Freshwater is already affected widely in Malaysia. Coastal waters may be involved soon if preventive action is not taken. Locally, there is atmospheric pollution and aerial deposits obscure vegetation and poison the topsoil, especially where heavy applications of pesticides are made. The whole world is at risk to radioactive pollution, although Malaysia is as yet less seriously affected.

PRECIPITATION. All the water which reaches the earth from the atmosphere. Nearly all the precipitation in Malaysia is as rain, although dew and hail also occur. In other regions, snow and hoar frost occur too.

PREDATOR. An animal which preys on others, especially by hunting, killing and eating them. The hunting aspect introduces an element of selective pressure tending to promote the survival of the fittest predators and to eliminate the least fit among the prey.

PRIMARY. Of vegetation which is natural, undisturbed by man and his animals, any stage in the natural succession from pioneer to climatic (or edaphic but not biotic) climax.

PROTEIN. Complex organic compound consisting of a chain or chains of amino-acids.

PULVERISE. To reduce to a fine powder.

QUARTZ. A hard crystalline form of silica.

QUARTZITE. An impervious rock of metamorphosed sandstone consisting of quartz cemented by finer silica.

RADIATION. The emission of energy as rays, electromagnetic waves or particles. Solar radiation is the heat and light of sunshine. Radiation from radio-active sources can cause mutations and kill at high levels.

RAPTORE. Birds of prey which hunt by day.

RESISTANCE. The ability of living organisms to withstand infection by parasites or poisoning by toxic chemicals. The resistance of plants to diseases saves great expenditure on alternative methods of protecting crops. The wild flora is the natural reserve of resistance. The acquisition of resistance to chemicals by adaptation in insects and by pathogenic micro-organisms constantly erodes the effectiveness of pesticides, drugs and antibiotics.

RUBBER TREE. *Hevea brasiliensis.* Introduced from Brazil to Malaya in 1876/7, rubber is obtained in the latex flowing from the cut bark; more than 4 million acres (1.6 million hectares) have been planted in Malaysia. A classic example of a crop which has been more successful in plantations in countries other than its origin, where its performance is limited by diseases.

SAPROPHYTE. A plant (usually a bacterium or a fungus) which obtains its nutrients in solution from decaying, organic matter, so circulating the materials of dead plants and animals.

SATURATION. State of the air, when it contains the maximum amount of water vapour possible in stable equilibrium at the ambient temperature.

SCALE INSECT. Of the family Coccidae, the female is stationary on the host plants and has a covering of scale, some are pests.

SEAWEED. Marine alga, brown, green or red.

SECONDARY. Of vegetation in any stage of development after disturbance or modification by man.

SEDENTARY. Of soil formed from material weathered on site.

SEDIMENTARY. Of rocks formed by the deposition of suspended material from water.

SEED. A propagule developed from an ovule fertilised by a pollen nucleus and consisting of an embryo surrounded by protective coats and sometimes provided with additional food material. The seed-plants (Spermatophyta) are considered to be the most highly evolved and provide most of the dominant land-plants in the world today.

SILT. Fine material suspended in or deposited from water. Of pits (ditches) following the contours which arrest water flowing down hill and allow the silt to settle out instead of being carried away.

SOCIAL. Of a species of insect, whose members live together in an organised or cooperative society or family unit consisting of larvae and adults within a common shelter.

SOIL. The material covering the surface of the earth in which plants may root; the soil consists usually of rather loose particles of weathered rocks with organic admixtures, especially plant remains.

SPECIES. A natural unit in the classification of living organisms, a number of individuals whose characteristics lie within a defined range of variation. A species is often defined as a group of individuals which breed among themselves but are unable to reproduce with those outside the group; however, this criterion is difficult to determine in most actual cases and is found not to apply fully in many of those investigated, although the arrangement of the species described on other grounds is seldom altered for this reason. Nevertheless, despite differences of opinion whether two or more species should be "lumped" as one or one species "split" into several, there is general agreement on species in practice. For instance, most groups of plants or animals which share one common name in the local vernacular language correspond to species, each of which is given a scientific name of two Latin words.

SPORE. An initially single-celled reproductive body of a plant, which is not the product of sexual fusion. Spores are usually detached from the plant and distributed, sometimes in very large numbers. In the simplest plants the spores may give rise directly to new individuals, but in the more advanced plants, the spores develop into multicellular bodies which produce the sex cells, in the seed-plants only the male spores (*i.e.* the pollen) are dispersed.

STALACTITE. A mineral column hanging from the roof of a cave or over-hanging rock, which consists of material—usually calcium carbonate—deposited from water dripping down and evaporating from the column.

STALAGMITE. A mineral column building up from the floor of a cave or similar place by crystallisation of marble, *i.e.* calcium carbonate or other material from water dripping onto it. A stalactite and stalagmite may join to form a pillar. Stalagmite is sometimes used of the marble encrusted on cave walls and floors.

STEEP LAND LINE. An important concept in Land Capability Classification in Malaya, the contour above which the land is mostly steep with shallow soils liable to erosion if exposed and below which the slopes are more gentle, the soil deeper and the land more suitable for agriculture. The actual elevation of this contour varies from place to place.

STOCKING. The population of an animal which an area will support. The population may be measured in numbers, *e.g.* head of cattle, or in total body weight of the population.

STRAND. Shore of sea, estuary or lake.

SUBSOIL. The partially weathered material lying beneath the soil and merging with the parent material below. This vague, popular term is replaced in scientific descriptions of soil profiles by the "C horizon".

SUCCESSION. The progressive sequence of vegetation which develops from the colonisation of an area to the climax, edaphic or climatic in which a natural succession culminates. The succession in a particular environment is called a sere.

SUPER-SATURATION. The unstable and hence usually temporary condition of the air containing more water vapour than that required to saturate it.

SWAMP. Low-lying, wet land where the water-table is always close to and often somewhat above the soil surface.

SYMBIOSIS. The living together of dissimilar organisms (at least of different species and usually of different groups entirely) in close association to their mutual benefit. The lichens consist of an intimate mixture of fungi and algae. Other examples of symbiosis include nitrogen-fixing bacteria in nodules on leguminous plants, cellulose-decomposing bacteria in the gut of herbivorous animals, algae in corals. Sea-anemones and hermit crabs live together exchanging food and protection.

TERMITES. Social insects of the order Isoptera, found mainly in hot countries, called "white ants" because of their superficial appearance. Termites feed on cellulose and other plant material, only a minority are parasites of living trees or at least eat the dead wood of living trees and so bring about their collapse, most live on plant remains including constructional timber. In natural, tropical vegetation termites consume vast amounts of plant debris and play an important role in the circulation of nutrients.

TICKS. Blood-sucking mites which can transmit diseases.

TOPOGRAPHY. The description of a place, especially the shape of the superficial features.

TOXIC. Poisonous, especially of naturally occurring poisons secreted by bacteria or found in plants and animals.

TRACE. Of elements and nutrients essential to a living organism but only required in very small amounts, their concentration in tissues may be measured in parts per million compared with the major elements expressed usually as percentage (parts per hundred).

TRAP-DOOR SPIDERS. A group of primitive spiders with jointed abdomens, they line their nests with silk and cover them with a hinged lid.

TROPICAL. Of the region between the tropics of Cancer and Capricorn (respectively $23\frac{1}{2}$ degrees north and south), sometimes referring to areas beyond these latitudes where similar climate and vegetation prevail. The tropical region includes the equatorial region. Tropical is used generally to indicate those features which are found throughout the whole region (including the equatorial) notably the high annual mean temperature and rainfall. Tropical is less frequently contrasted with equatorial to indicate the conditions close to the tropics themselves, especially the marked seasonal variation in rainfall, but monsoon (monsoonal) is a less confusing usage for the climate and vegetation in these parts where a definite dry spell alternates with the rains.

UNGULATES. Hooved mammals, mostly herbivorous and living in herds.

VERTEBRATE. An animal with a backbone (fish, amphibia, reptiles, bird and mammals).

VIRUS. A sub-microscopic body able to multiply in a host organism, usually evident due to the resultant disease, and consisting of nucleic acid with a covering of protein, sometimes with fat as well. Some viruses have been obtained as crystals. No free-living viruses are known. Viruses have some properties accepted as typical of living organisms and other properties which are not. The debate whether they are living or not depends on the definition of life and which criteria are considered typical. Viruses cause many dangerous diseases of man and animals and economic losses of crops; a few have potential as parasites—natural controls—of insects and mammalian pests.

'GRAMOXONE' PP910

I.C.I. AGRICULTURE (MALAYSIA) SDN. BERHAD

In the battle of weed control...

a breakthrough

'Cock's Head' products help Malaysia grow

ICI

'COCK'S HEAD'
GRANULAR FERTILIZERS



NOW WITH A NEW COATING!

CLEAN, FREE-FLOWING & VIRTUALLY DUSTLESS

'Cock's Head' brand Compound and Straight Granular Fertilizers have a new coat to ensure easy and effective application. The special coating of each granule prevents caking, and provides a free flowing, easy to apply fertilizer. Every granule is packed with the required plant nutrients.

ICI

'Cock's Head' agricultural products help Malaysia grow

VITAMIN. Organic compounds required in trace amounts by a living organism and essential to its health and normal functions, but which the organism is unable to make for itself and must obtain from the environment usually as food. Most animals and many fungi have vitamin requirements, but most green plants have none, because although the latter need the same compounds to function, they can make them from simple nutrients for themselves.

WATER-TABLE. The level of water in the soil, below which all the pores are filled with water. The water-table rises and falls with the rainfall, drainage and evaporation of water. The water-table may be above the soil surface during floods or in water-logged swamps.

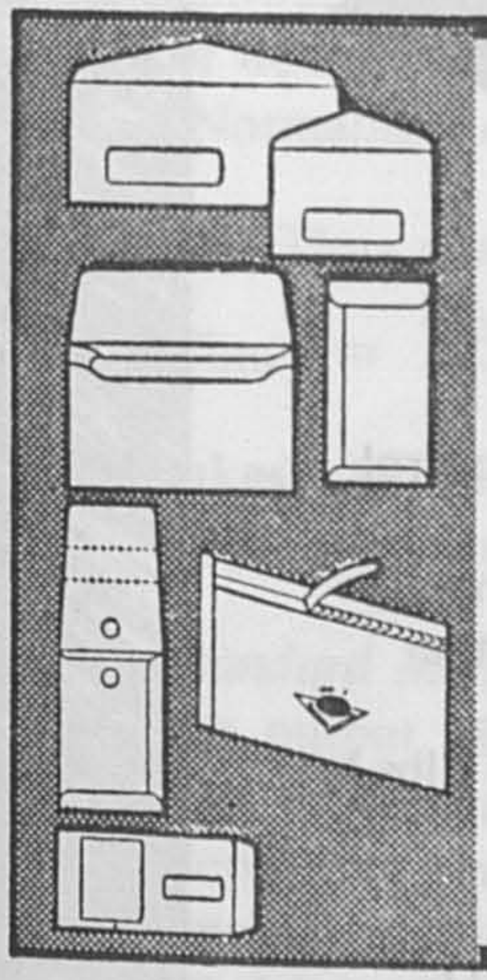
WEED. A plant growing where some human does not want it, especially if it is competing with crops or detracting from planted ornamentals. Not all weeds are aliens, but many which are introduced grow very rapidly free from the pests and diseases in their country of origin.

WILDFOWL. Game-birds especially of wet places.

WILDLIFE. All living things except those cultivated or kept by man at any given place; the natural flora and fauna.

YEASTS. Single-celled fungi able to carry out fermentations and to produce various vitamins.

ZONATION. The formation of zones, belts or strips of different types of vegetation associated with variation in the environment. The zonation of the earth is by latitude from the frigid zones near the poles to the torrid done of the tropics and equator. Altitudinal zonation is found on mountains. Littoral vegetation shows zonation according to the depth and frequency of inundation, the development of the soil, elevation and drainage. Zonation occurs along river banks and around lakes.



B&P MANUFACTURERS OF THE LARGEST RANGE OF
ENVELOPES
FOR POSTAL, PACKAGING & SYSTEMS

B & P are your envelope specialists! Prompt service, expert advice, free samples! For all your envelope needs, call the B & P man!

Jiffy
"Pack your goods in a Jiffy"
PACKAGING SYSTEMS
For Expert Advice Phone
03-26 687 * 03-290 291

SYARIKAT BESLEY & PIKE PTY. BHD.
135, Jln T Ab Rahman, Kuala Lumpur, Malaysia.

AVERY
LABELS & LABELLING SYSTEMS

The world's largest manufacturers of self-adhesive labels, with the longest experience in specialised applications and largest range of materials, adhesives and dispensing equipment.

Contact: 03-26 687, 03-290 291
Syarikat Besley & Pike Pty. Bhd.
135 Jln T Ab Rahman, KLumpur

If blue stain is your problem Hickson has the solution.

HICKSON

ANTI-sap STAIN

Hickson's have developed a balanced solution for the effective control of blue-stain fungi in freshly sawn timber and veneers.
The basic ingredient in Anti-sapStain – Sodium Pentochlorophenate – is widely recommended by all research establishments as one of the best chemicals to check blue-stain fungal growth.
Hickson's Anti-sapStain comes ready for use in packs of 5 kg. (11 lbs.)

For more details contact:
HICKSON'S TIMBER PRESERVATION (M) SDN. BHD.,
45 MEDAN MERDAKA, PETALING JAYA, MALAYSIA.

Planter, Kuala Lumpur **49**: 245–250 (1973)

Work Study: the technique of work measurement (2). Group timing and estimating

J. S. BALLARD

In a previous article* the technique of activity sampling was presented. Here a more advanced technique of Work Measurement will be considered, that of Group Timing.

Rating

Subconsciously, techniques of rating are applied daily. How fast is an approaching car travelling? How fast do we need to run to catch a bus? How fast do we have to step aside to avoid being hit by a falling branch? Most people possess some degree of rating ability, but to become fully competent at rating, many hours have to be spent practising on the job with a qualified work study officer, and rating activities depicted on special films. A person untrained in rating should not place too much emphasis on techniques requiring rating.

Standard rating. Imagine an average man walking on flat, firm, level ground at 4 m.p.h. and call this rating 100, or Standard Rating. The standard rate will then correspond to the average rate at which a qualified operator will naturally work at the job, provided that the operator adheres to the specified method of work and provided that he is motivated to apply himself to that work.

If the Standard Rate is maintained and the operator takes the appropriate rest allowance, he will achieve Standard Performance, that is 60 units (Standard Minutes) of work per hour. A worker giving the Standard Performance will give the true time (Normalised or Basic Time) required to perform a specific task.

Thus a worker rating 90 takes 10 min. to perform an operation. Normalised Time $= \frac{\text{Observed Time} \times \text{Observed Rating}}{\text{Standard Rating}} = 9$ S.M. A worker rating 100 takes 9 min. to perform a task. N.T. = 9 S.M. Thus rating allows for the calculation of the true time to perform an operation irrespective of the actual time taken.

Standard Minute. This is the unit of measurement of work output. It represents the output of work of one minute of the allowed time for any given operation. The unit consists partly of work and partly of relaxation, the proportion of each depending on the job. For instance, very heavy work in unusual positions and severe conditions will have a high relaxation allowance. The Relaxation Allowance (R.A.) is an allowance made to the worker for personal needs and recovery from fatigue caused by the job. In the following example a R.A. of 5% has been given.

---

*BALLARD, J.S. (1973). Work Study: the technique of work measurement. 1. Activity Sampling. *Planter, Kuala Lumpur* **49**, 114–118.

The B.S.I. Rating Scale is as follows: —

75 *Day Work Performance.* Steady, deliberate, unhurried performance, typical of a worker under good supervision but not on piece work. Looks slow but time is not wasted intentionally.

100 *Standard Performance.* Brisk businesslike performance, typical of an average trained worker on piece work achieving the necessary standards of quality and accuracy.

125 Very fast performance, exhibiting a high degree of assurance, dexterity and co-ordination of movement. Well above the average worker.

150 Exceptionally fast, requiring intense effort and concentration. Unlikely to be held for long periods.

Factors affecting rating

Speed. Amount of care required to carry out the job will be directly proportional to the amount of time required.

Effort. Increased effort will tend to increase the time required.

Effectiveness 1. Outside the control of the worker.

(i) Decreasing efficiency of tools and equipment due to ageing and malfunctioning.

(ii) Minor changes in method and conditions of operations. Seasonal variation of product.

(iii) Inconsistent changes in work environment such as climate, temperature, lighting, ground conditions.

(iv) Insufficient work available.

Effectiveness 2. Within the control of the worker.

(i) Quality of work required.

(ii) Suitability of worker for the post. Physique and competence.

(iii) The worker's attitude of mind towards the job.

Speed, effort and effectiveness must be borne in mind when rating. This can only be done properly if the observer thoroughly understands the job before he attempts to rate it.

Group Timing

This is a direct measurement technique performed in a similar manner to Activity Sampling, but with recordings of the group activity being made at regular intervals. Using a watch (preferably a stopwatch), a detailed study of a number of

operators and/or machines can be made simultaneously by one observer. Used successfully when standard times are required for jobs where a group of operators is involved, especially in areas such as stores and warehouses.

Before the preliminary study is carried out to determine the activity breakdown, all persons to be involved should be informed or consulted. Having decided upon the breakdown, consider the number of operators involved and decide on suitable time intervals for the observations, *e.g.* two workers every 30 seconds, three to six every minute, seven to ten every 2 minutes. The observations will be carried out over a full day's work.

Start the watch at the beginning of the shift and commence recording at pre-determined intervals (*Fig. 1*) under the appropriate headings, simultaneously making a rating.

On completing the study the results are calculated and a Standard Time calculated (*Fig. 2*).

Study No. B11 *Sheet No.* 1 *Observer* JSB *Date* 9.9.72

Workers *Shift*

Time	Activity									Rating	Remarks
1	✓✓									90	
2	✓✓✓									100	
3	✓✓			✓						90	
4	✓✓									85	
	450	370	10	95	117						1350

Fig. 1. An example of an Observation Sheet

	Activity	*Observations*	*% of total*	*Time per shift of 3 men (min.)**	*Normalized† Time (min.)*
1	Unloading bags	370	27.40	370	333.00
2	Examining shipping note	10	0.74	10	8.70
3	Recording	95	7.04	95	85.50
4	Wheeling trolley	117	8.66	117	97.11
5	Unloading				
6					
7					
		1350	100	1350	1194.75

* 27.40% of 450 min. shift × 3 operators.

† Apply *average* rating observed *e.g.* N.T. $= \frac{370 \times 90}{100} = 333$

$$\text{N.T.} = \frac{10 \times 87}{100} = 8.70$$

Fig. 2. An example of an Analysis Sheet

An example of Group Timing

Three men are unloading fertilizer from a carrier into the store, recording receipts, and placing the fertilizer in stacks in its allocated position.

After a brief pilot study the following activities became evident: (i) Unloading bags; (ii) examining shipping notes; (iii) recording details on record cards; (iv) wheeling trolley to its allocated stack; (v) unloading bags to stack; (vi) walking between stack and carrier; (vii) absent from observation area; (viii) idle; (ix) other work not foreseen at start of study, *e.g.* rebagging broken bags, *etc.* Observations will be made every minute over an 8-hour shift (*Fig. 1*). The total number of men required is 3 × 450 min. = 1350. ($\frac{1}{2}$ hr break)

On completing the study, all the columns on the observation sheet should be totalled and summarised on an Analysis Sheet: —

$$\text{Work Opportunity} = \frac{\text{Total N.T. + 5\% N.T. (R.A.)}}{\text{Total Elapsed Time}} \times 60$$

$$= \frac{1194.75 + 59.73}{1350} \times 60 = 55.74 \text{ Standard Minutes}$$

Thus work opportunity totals 55.74 min. out of 60, which is slightly less than standard performance but much better than day work performance.

During the shift 1 000 bags of fertilizer were received into stock and stacked so the time taken per bag was:

$$\frac{1194.75 + 5\%}{1000} = 1.254 \text{ S.M.}$$

It can be seen that Group Timing is a useful technique, especially when standard times are of benefit. It is an economical way to deal with multi worker/machine situations, and does not preclude the use of Stop Watch Timing at a later stage. It highlights the areas in which more advanced timing techniques could be beneficial.

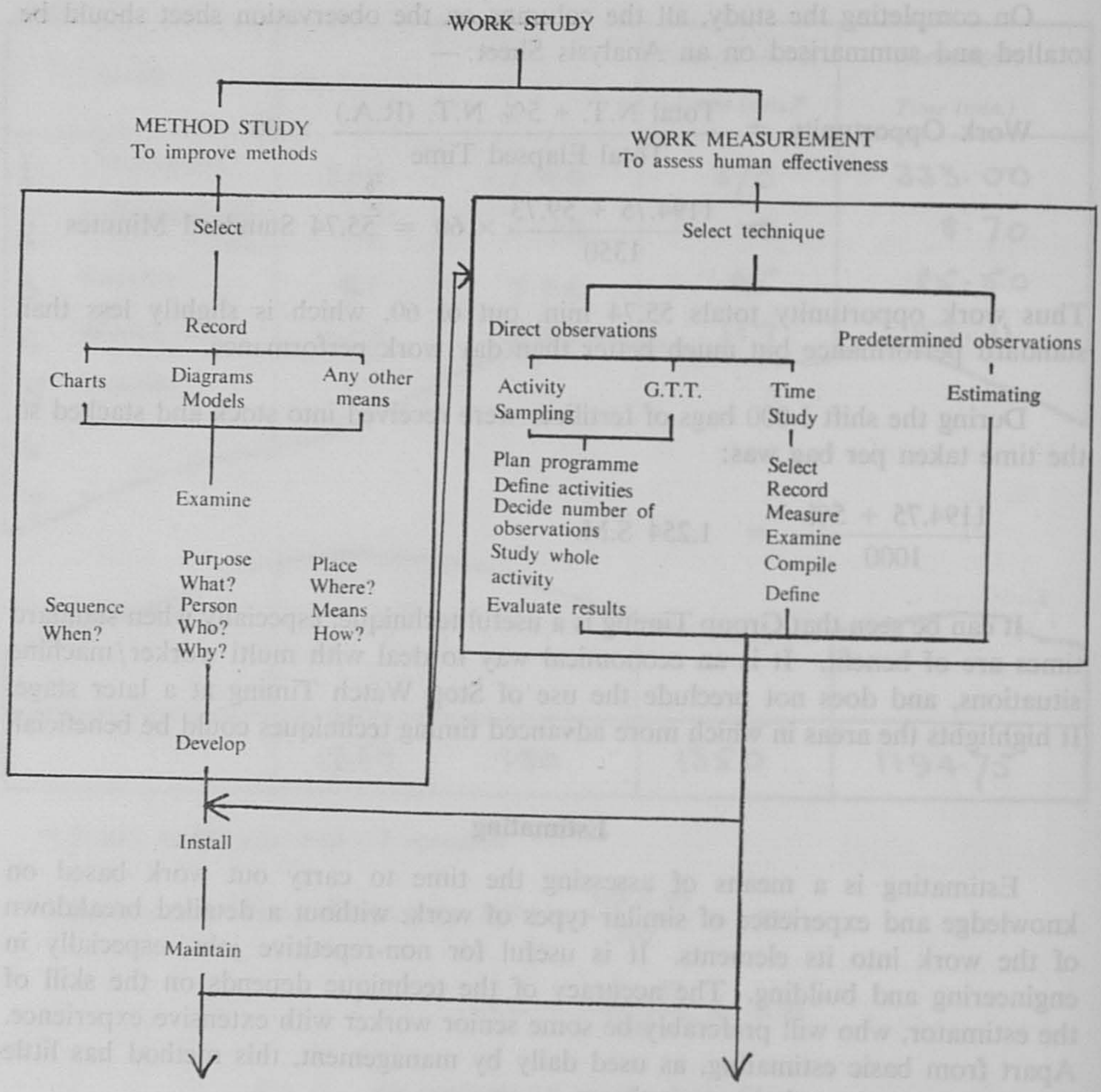
Estimating

Estimating is a means of assessing the time to carry out work based on knowledge and experience of similar types of work, without a detailed breakdown of the work into its elements. It is useful for non-repetitive jobs, especially in engineering and building. The accuracy of the technique depends on the skill of the estimator, who will preferably be some senior worker with extensive experience. Apart from basic estimating, as used daily by management, this method has little use in agriculture at the present time.

Conclusion

In this and the two preceding papers, an attempt has been made to introduce work study as an aid to management practice by discussing those techniques that have the most relevance to agriculture. Method Study and Work Measurement are complementary techniques. They have been discussed separately only for convenience of documentation. Each problem or study should have those techniques applied to it that will assist in its solution (*Fig. 3*).

It must be stressed again that Work Study is not a substitute for good management, in fact, by itself it can achieve nothing. Its success depends on the use to which it is put. Work Study should be used continually to examine land and buildings, plant and machinery, as well as materials and men.



Improves methods of work/operation/activity.

Improves organization, planning control.

Improves manpower effectiveness.

More efficient and economic planning.
Improves planning and control.
Sets reliable performance standards.
Provides a sound basis for developing incentives.
Provides a reliable basis for labour control.

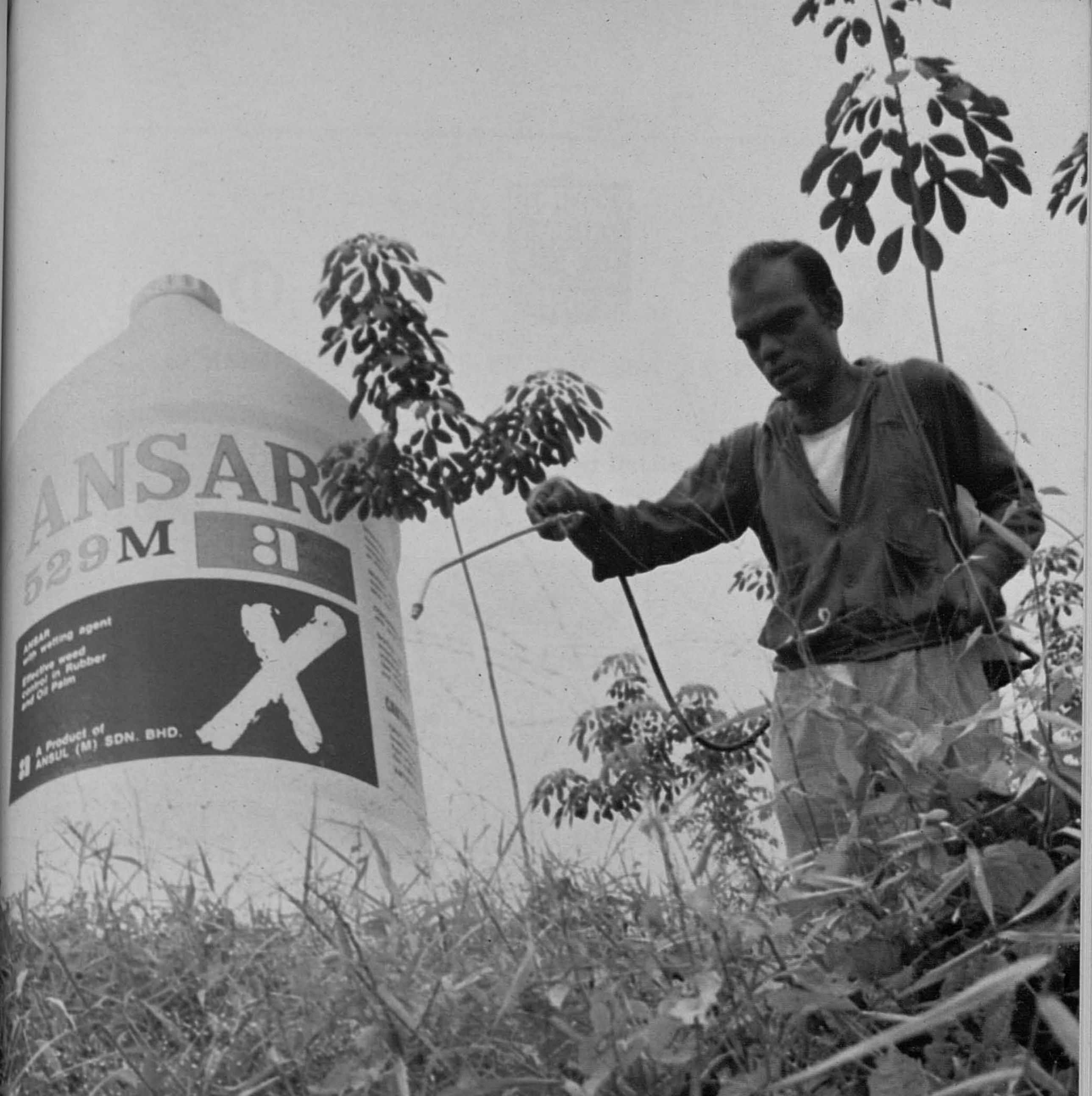
* CURRIE, R.M. (1967). *Work Study*. London: Pitman.

Fig. 3. Summary of Work Study (after Currie)*

Bibliography

CURRIE, R.M. (1962). Work study. London: Pitman.

MORRIS, J.E. & CHEONG, S.F. (1964). An illustration of Work Study applied to estate factories. *Plrs' Bull. Rubb. Res. Inst. Malaya No.* **74**, 187.



The return

SUPER CONCENTRATED ANSAR 529M WITH 6.6 LB MSMA IS BACK.

a Product of:
ANSUL (MALAYSIA) SDN. BERHAD,

Sole distributor:
HARRISONS & CROSFIELD (MALAYSIA) SDN. BERHAD,

SI-RUSA INN

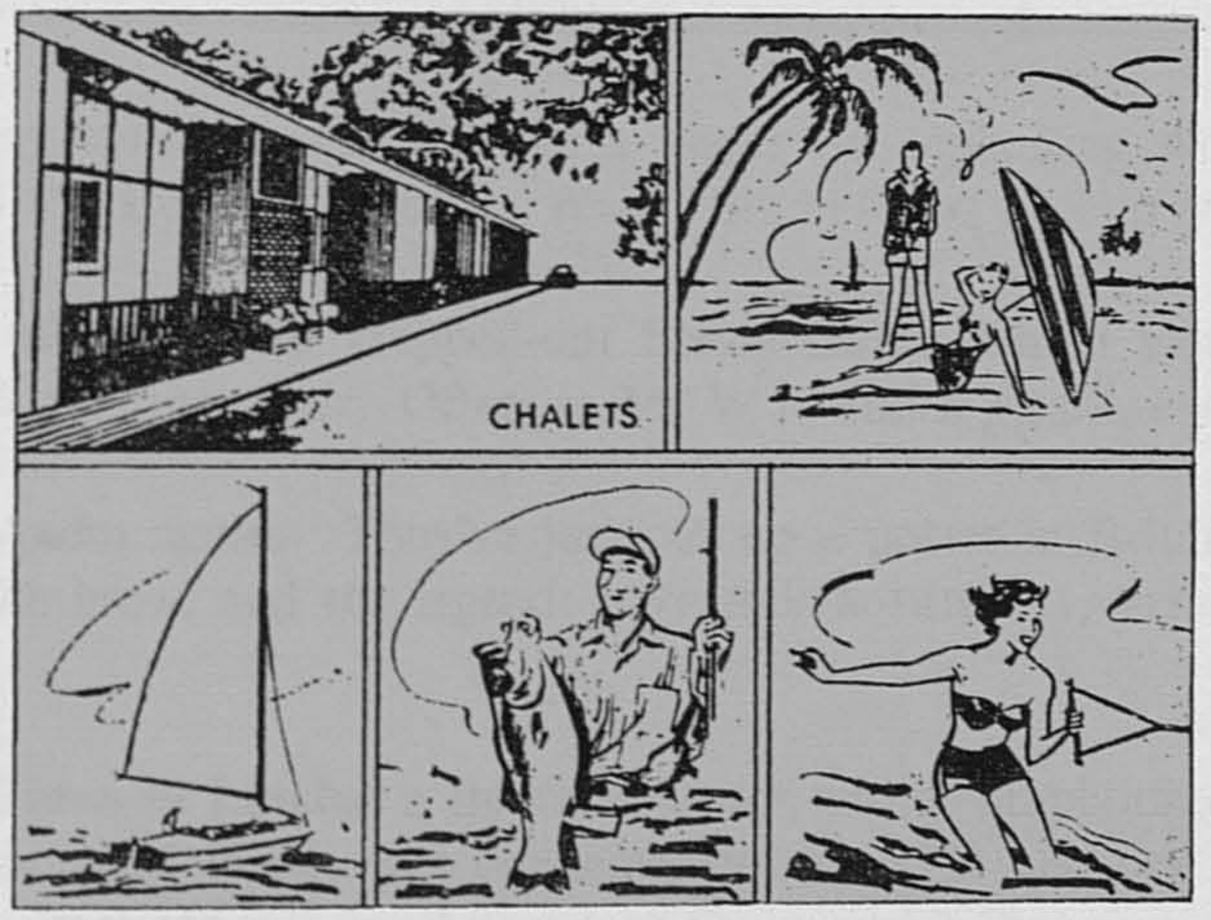
AMERICAN EXPRESS CARDS

SUNSHINE HOLIDAYS BY THE SEA AT PORT DICKSON

For Reservations, Write or Phone:—

THE SI-RUSA INN,
7th Mile, Jalan Pantai, Port Dickson, Malaysia.
Telephone: Telok Kemang 231

WEST MALAYSIA'S VACATION LAND!



The SI-RUSA INN has more than 130 air-conditioned and 'Sea Breeze' Chalets, with twin beds, private bathrooms (Hot & cold water), built-in wardrobes, extn. phones, wall to wall carpeting, and rental rates commencing @ $22 to suit all holidaymakers pockets.

The facilities available include:

Deep Sea Fishing	—	Inshore Fishing
Swimming and Bathing	—	Speedboats
Television	—	Water Skis
Fast Laundry Service	—	Sailing Boats
'Long Term' Discounts	—	'Off-Season' Discounts
Safe, clean beach	—	Golf (Local 9 holes)
Asian Cuisine	—	European Cuisine

And our latest attraction—A new 'LARK' 15 ft Sailing Dinghy for experienced 'Yachtsmen'

WE HAVE EVERYTHING—INCLUDING PEACE AND QUIET IF YOU WANT IT—
WHY TRAVEL OVERSEAS WHEN EVERYTHING YOU REQUIRE IS HERE?

The monthly crop

Advances in Oil Palm Cultivation the full proceedings of last November's International Oil Palm Conference are now in the final stages of being printed and first copies are expected to be available in August. Our July issue will contain an order form.

A leading Kuala Lumpur supermarket has frequent full-page advertisements in the daily press. much of them taken up with job lots and bargain issues. Occasionally there is confusion. Listed under 'After Dinner Snacks' (whatever they may be) we found: FLEA AND TICK KILLER.

Mail from France is piling up in Australia's post offices because postal workers are protesting against the French nuclear tests. Mail addressed to France is likewise being delayed. As *The Straits Times* put it so delicately in their headline (8 June): AUSTRALIA STOPS HANDLING FRENCH LETTERS.

Did you know they cared? The title of a paper on replanting which recently emerged in proof form from our printers, read: THE FEELING OF OLD OIL PALMS.

A good home is offered for a clapped-out Servis Cutter which would not cost too much to put in working order. Offers to Mr W N Smith please, c/o ISP.

Guinness take the palm again. They've just put up a poster in Britain showing a foaming glass of the brew, and the legend: I'VE NEVER TRIED IT, BECAUSE I DON'T LIKE IT.

In a letter to The Times of London a Bedford doctor wrote complaining of frequent faults on his telephone after this was connected to the STD network. He quoted the reply from the Post Office's local Head of Operational Planning, which read: "Would you try your telephone now, and if you are unable to use it, please report the difficulty by dialling 151. Please let me know if you do not receive this letter".

Tension in Peking. A high-powered Chinese medical delegation recently visited Britain on a research tour, the first of its kind since the Sino-British thaw. A few members of the press managed to get into the reception staged for the visitors by the British Council and the London *Sunday Times* reported considerable language difficulty. After stating that Chinese heart complaints were in the main due to hypertension, Dr Liu Li-Sheng, a lady heart specialist, was asked if there was much hypochondria in China, and was *thought* to have replied "No, the soil is not suitable for it".

Appointments vacant

Under technical assistance arrangements financed by World Bank, the Government of Indonesia, with the objective of developing some 13 000 hectares of tea smallholdings and private estates in West Java, wishes to employ 3 experienced personnel who would advise and assist the Project Manager. Candidates should have at least 8–10 years experience in their particular fields. The positions to be filled are those of:

(1) Chief Project Adviser (for a period of 4 years)

(2) Financial Assistant (for a period of 1 year)

(3) Technical and Development Assistant (for a period of 4 years)

Prospective candidates should write for full details of terms of reference before July 15, 1973 to:

Badan Khusus Urusan P.N. Perkebunan (BKU-PNP)
Jalan Jenderal S. Parman 73, Slipi
P.O. Box 392/Jkt
Jakarta,
Indonesia.

SPECULATIVE STRETCH

The Far Eastern Rubber Market is gripped in speculative fever. At 31.52 pence a kilo, rubber has soared 114% in a year—a full 30% of this in the past month. Industrial buying to beat the speculation is now only fuelling it further. If rubber stays at this price, synthetic production will rapidly increase again, bringing gloom back to Malaysia's plantations.

from *The Economist* 23rd June

Pesticides in the modern world

We begin a new series this month of short papers from a symposium prepared by members of the Co-operative Programme of Agro-Allied Industries with FAO and other United Nations Organisations.

(1) — PESTICIDES IN PERSPECTIVE

Despite improved farming practices, including the application of pesticides and fertilizers, world food production has barely kept pace with the growth of population in this century, and half of the world's population today has an inadequate diet. Food supplies will have to be doubled in the next 30 years to achieve even a moderate advance in nutritional standards. A recent study[1] by the United Nations Food and Agriculture Organization (FAO) indicates that a greatly increased use of pesticides and fertilizers is among the measures essential for achieving the massive expansion needed in food production. The "war on waste", according to FAO, could become the most important factor of all in the battle against malnutrition, especially since only some 30% of the world's land area is suitable for agriculture, and much of this is lost annually through soil erosion and industrial development. To counterbalance this loss, crop yields must be increased and the food losses caused by pests must be reduced.

Quite apart from all this, agriculture is the world's major industry: in 1965, 52%[2] of the world's population was dependent on it for its livelihood. To disrupt such an essential bulwark of the world economy by denying it one of its essential inputs—pesticides—would clearly be to court disaster and to imperil the living standards of tens of millions of people, many of them in the Third World. And in industrial countries, where farm labour is becoming increasingly scare, the use of pesticides is an important factor in enabling farmers to market, at a reasonable price, the high quality produce expected by the modern housewife.

Benefits to agriculture and human health

Pests destroy up to one-third of the world's food crops during growth, harvesting and storage. In developing countries crop losses are even higher: in Latin America, for example, they may reach 40% of everything produced. And locusts plague a fifth of the world's land surface, affecting a tenth of the population. A typical large swarm will consume 3 000 tons of plant material per day.

The large-scale use of agricultural chemicals is already one of the main factors in eliminating such losses. Thus, in Ghana, which is the largest exporter of cocoa in the world, the use of insecticides has effectively controlled damage to the crop by the capsid bug and led to almost a trebling of yields. In Pakistan, widespread use of an insecticide on the sugar crop increased the previous yield by one third. In cash terms, an additional $7.2 million worth of sugar was harvested after an expenditure of $77 000 on insecticides. Nor is it only food crops that need protection

by pesticides. FAO estimates that without the use of insecticides 50% of the cotton production in developing countries would be destroyed by pests.

The effects of banning or restricting pesticides in a highly developed country can also be gauged by an example from the *Agriculture Committee Pesticide Report to the Great Lakes States' Governors* in the U.S.A.[3]:

"Stopping the use of pesticides in the Lake States would reduce the value of agricultural production by over $\$1\frac{1}{2}$ billion annually. Of this, loss from eliminating insecticides would account for over $650 million, from eliminating herbicides for weed control over $635 million, and fungicides for plant disease control over $230 million. The impact on the total economy would be many times larger.

"The benefit to risk ratio in using registered pesticides as recommended is definitely documented in favour of these pesticides uses."

The control of certain insect-borne diseases has only become possible with the introduction of modern insecticides. In the case of malaria, their use has saved millions of lives and enabled whole populations to work more actively, with great economic benefit. The world annual death rate from malaria has been reduced from six million in 1939 to two-and-a-half million today. Similar progress has been made in controlling other important tropical diseases such as yellow fever, sleeping sickness and Chagas' disease.

A report of the Director-General of the World Health Organization (WHO) concludes that the indoor spraying of DDT in routine anti-malaria operations does not involve a significant risk to man or wildlife, and that the withdrawal of this insecticide would be a major setback for human health[4].

Modern pesticides

Although pesticides have been in use for many centuries, until the discovery of the insecticidal properties of DDT in 1939 they were nearly all inorganic chemicals—with the exceptions of petroleum spray oils, some insecticides of plant origin, and some seed dressing material. It has been during the last 25–30 years that the modern organic pesticides in use today have been developed. These modern materials are compounds which effectively control organisms that destroy or endanger man's food, health or environment. The main groups of pesticides are: insecticides; miticides or acaricides (used against mites or—in Latin—*acari*); fungicides; herbicides; and nematicides—used respectively against plant diseases, weeds, and plant parasitic nematodes or eelworms.

Pesticides, like virtually every chemical, may have physiological effects on other organisms living in the environment, including man himself: whether the effects occur or not is simply a question of the dosage and of proper use. There are numerous examples of substances which are needed by plants and/or animals, but which in overdoses are poisonous: common salt, some heavy metals and various trace elements spring readily to mind. The majority of the established pesticides

have no adverse effect on man, animals or the environment in general, so long as they are used only in amounts sufficient to control the pest organisms; but they can be harmful in excessive amounts.

In the case of compounds that are used to control fungi or weeds, toxicity to mammals is usually very low. The more closely a group of pest species is related to mammals, the more difficult toxicological problems become: it must not be forgotten that insects are animals, nor that there are other pests, such as rats, which are themselves mammals.

It is generally accepted that pesticides which are specific to the pest to be controlled are very desirable, and some are, indeed, available. However, such products can be very expensive because of their limited rang of application.

Dilution

Pesticides are very rarely used in the form of the pure or technically pure compound (*i.e.*, the active ingredient), but are formulated to make them easy to apply. Formulations may be in the form of dusts or granules, which usually contain 5–10 % active ingredient, or wettable powders or emulsifiable concentrates (usually 40–80% active ingredient); other formulations for special purposes are also used. It is important to realise that the formulations which are used as sprays (as opposed to dusts and granules) are further diluted with water, oil or other solvents to a concentration of usually only 0.01—1% before application. The amount of active ingredient, therefore, which is eventually released to the environment is generally extremely small.

Official approval

In almost all countries of the world pesticides have to be approved and registered by the agricultural and health authorities, advised by FAO and WHO. Registration will only be granted if the compound is safe both during application and to the consumer. Considerable safety margins are taken into consideration in these decisions.

It is essential to remember that the very safest pesticides must be used carefully, and in accordance with the manufacturer's instructions. As with other products of our civilisation, like electric power, automobiles and pharmaceuticals, pesticides provide enormous benefits to man if they are properly used, but they can involve hazards if they are handled carelessly.

References

(1) *Indicative World Plan for Agricultural Development,* submitted by FAO to the Second World Food Congress in The Hague, June, 1970.

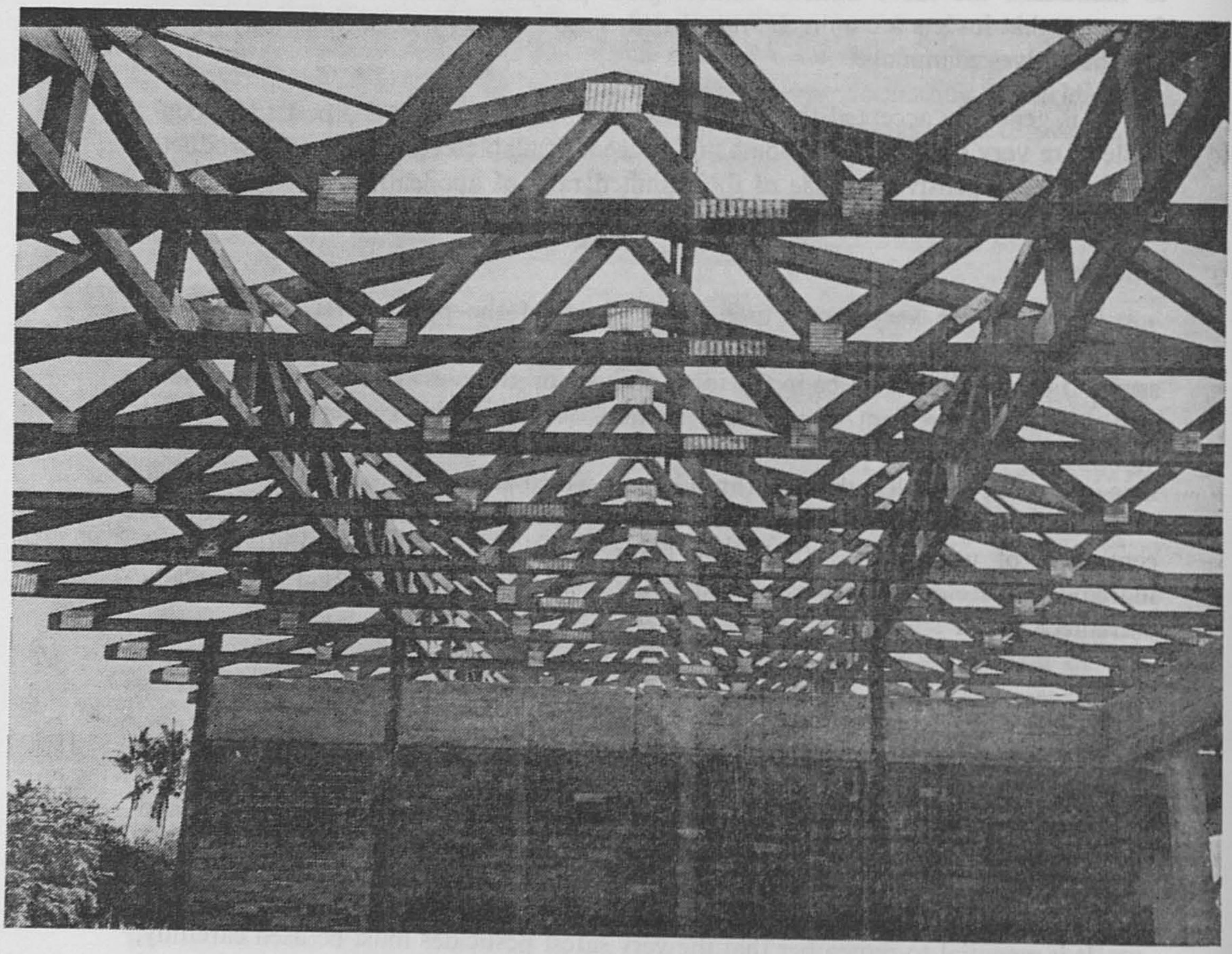
(2) *FAO Production Yearbook,* **24**. Food and Agriculture Organization, Rome, 1970.

(3) *Agriculture Committee Pesticide Report to the Great Lakes States' Governors* (*Illinois, Indiana, Michigan, Minnesota, Wisconsin*), 1st August, 1969.

(4) Vector Control. *WHO Chronicle,* **25**, 5, 1971.

GANGNAIL®

For design freedom in roofing



Gangnail trusses offer the ultimate in design flexibility, reduced construction time and minimal supervision. Gangnail trusses are custom built for spans up to 100 feet.
Full information is available from Hickson's.

Gang-Nail connectors are manufactured by Automated Building Components (Aust.) Pty. Ltd, and distributed by

HICKSON'S TIMBER PRESERVATION

HICKSON'S TIMBER PRESERVATION (MALAYSIA) SDN. BERHAD
Petaling Jaya • Ipoh • Butterworth

HICKSON'S TIMBER PRESERVATION (SINGAPORE) PTE. LIMITED
Singapore

HICKSON

Hotel concession rates for ISP members

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

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

In most hotels members must be prepared to pay a 10% Service Charge, and in Singapore there is also a 3% Government Tax.

HOTEL		*DISCOUNT*
KUALA LUMPUR		
Federal	—	*See* Supplement
Fortuna	—	20%
Hilton	—	20%
Majestic	—	10% (30% for monthly residents)
Malaya	—	10%
Malaysia	—	15%
Mirama	—	20%
Pacific	—	10%
Station	—	10%
SINGAPORE		
Cockpit	—	20% (w.e.f. 1 July 1973 15%)
Goodwood Park	—	10% (direct booking—no agents)
Hilton	—	20% (valid until 31.12.73)
Miramar	—	20% (direct booking—no agents)
New Hongkong	—	10% (lower-rated)
		20% (higher-rated)
Oberoi Imperial	—	15%
Station	—	10%
PENANG		
Ambassador	—	20%
Central	—	10%
E & O	—	10%
Merlin	—	20% (valid until 31.12.73)
PORT DICKSON		
Si-Rusa Inn	—	10%
EAST MALAYSIA		
TAWAU		
Royal	—	10%
SANDAKAN		
Nak	—	10%
KOTA KINABALU		
Borneo	—	15%

DATELINE KUALA LUMPUR



BACK ON THE ROADS

It naturally gives *The Planter* much satisfaction to hear the words 'Rubberised Roads' from the lips of the Prime Minister and this is what happened at the recent Regional Road Engineering Conference in Kuala Lumpur and it is all the encouragement we need to return to this subject, if only to clear up a few misunderstandings which have arisen each time it is mentioned.

It was said at Kuala Lumpur and reiterated by Dr Mullins of NRPRA at the recent RRIC Conference in Sri Lanka that rubberising of roads can never add greatly to world consumption of rubber, let alone NR. But it can and does add greatly to road safety by prolonging the life of the road surface. It has been proved in Britain, USA and Sri Lanka that the heavier the traffic, the greater the 'profitability' over the conventional surface. We have quoted before from one British test in which one side of a road was rubberised and the other not, the rubberised side gave three times the 'life' of the untreated side.

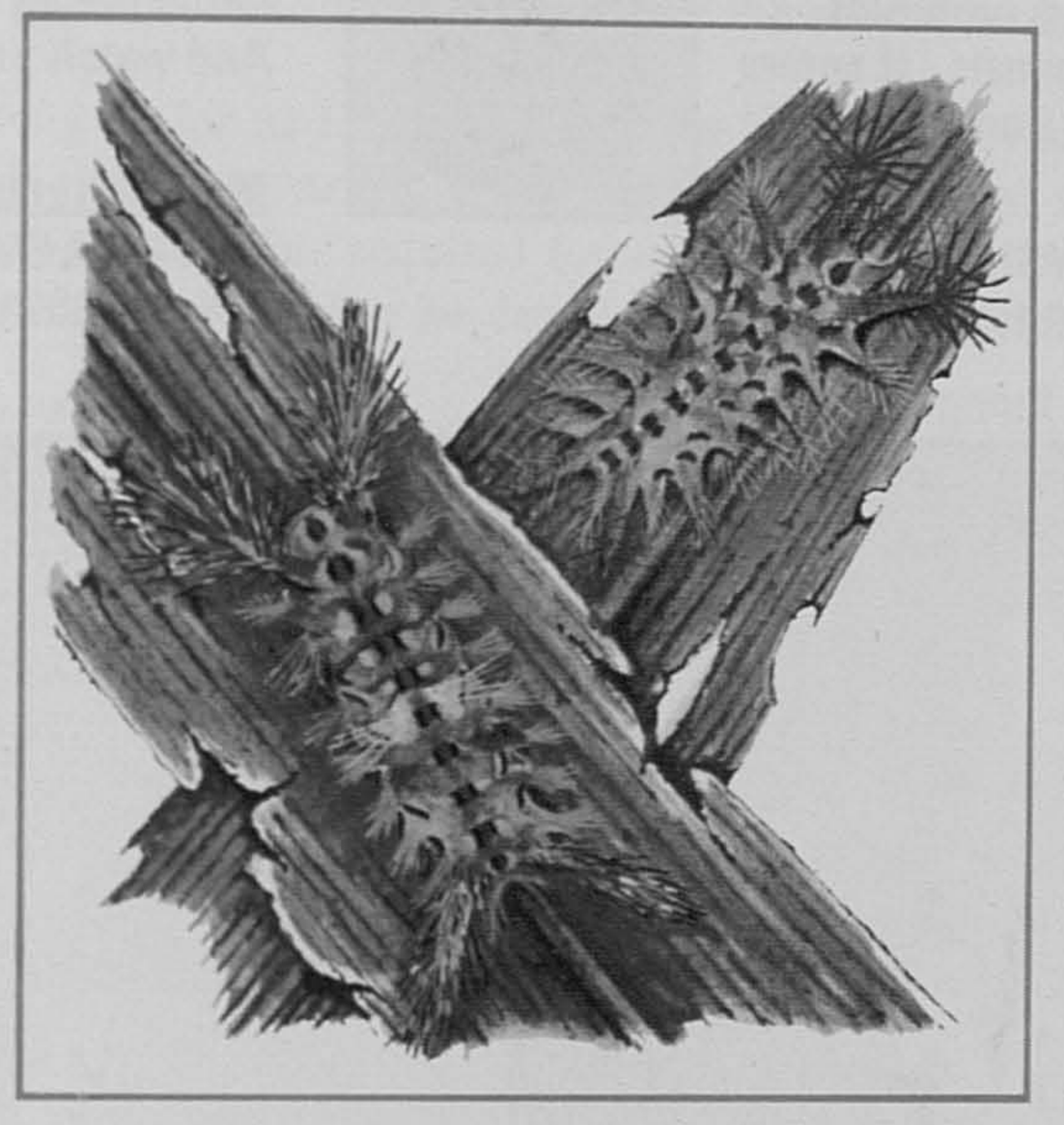
If this means that a heavily-trafficked road such as our Route One need be resurfaced every 3 years instead of yearly then the profitability aspect is obvious. Not so obvious is the gain in safety as the number of pot-holes should be reduced to one third.

Also not so obvious is that the pot-holing and other damage is caused by the heavier vehicles, the heavier the more so, in a rising compound ratio. To illustrate this we quote Mr Roger Calvert the Hon Secretary of the (British) National Council on Inland Transport who states that the damage done to a road by the passage of a four-wheel lorry weighing 10 tons is only equalled by the passage of 10 000 cars, each weighing 1 ton, but a lorry with an 11-ton axle load does nearly $1\frac{1}{2}$ times as much damage!

When travelling on Malayan roads, one gets the impression that there must be at least twice the number of lorries registered as there are private cars. If this is not so, it certainly seems like it. The knowledge that it's the lorries which cause the road damage while the smaller vehicles suffer, the filthy exhausts and the general arrogance of their drivers understandably give the lorry sector fairly poor 'public relations' with the private car driver and, more importantly, owner.

In the USA, road tax is levied on a scale related to the axle load capacity of the vehicle and therefore the potential amount of wear/damage to the road. This

When unwanted guests like these drop in for lunch on your plants.....

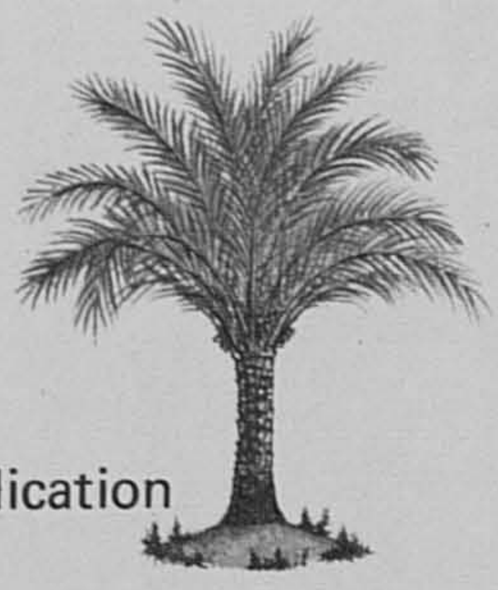


.....serve them MATACIL®

When your plants are being destroyed by hard-to-kill nettle caterpillars, MATACIL is the most effective way to control them.

In addition, MATACIL spares beneficial insects.

MATACIL is economical to use at an application rate of ¼ lb. per acre.



BAYER (MALAYSIA) SDN. BHD. BAYER (SINGAPORE) PTE. LTD.

KUALA LUMPUR · PENANG · SINGAPORE

®DIPTEREX SP95 WILL FIX THEM!

Your oil-palm will take to Dipterex SP 95. Bagworms, nettle and slug caterpillars will not. Its effectiveness as a stomach poison will rid your oil-palm estate of these pests, quickly, efficiently, while ignoring harmless insects. Dipterex SP 95 is odourless, and is safe to humans and animals. It comes in a soluble powder and you don't have to worry about clogged nozzles for Dipterex SP 95 dissolves completely. Its ULV formulation means effective small volume application over large areas. Which means time and money saved during spraying.
Let Dipterex SP 95 fix them.
And watch your profits grow.



BAYER

Sole Importer:
BAYER (MALAYSIA) SDN. BHD.
BAYER (SINGAPORE) PTE. LTD.
Singapore. Kuala Lumpur. Penang.

Manufacturer:
BAYER LEVERKÚSEN
(W. GERMANY)

BAYER

® Registered trade mark of Bayer, Germany.





seems absolutely fair and democratic and makes our engine-capacity system look quite the opposite.

If the object of the increases in road taxes and driving licence fees in recent years was to raise more money for road upkeep, wouldn't it have been fairer to levy it on the heavier vehicles' tax? After all, they cause the damage, and in addition are being run for profit whilst the private car for the most part is not.

Whilst not going so far as to suggest that the ten-ton lorry should be taxed at one thousand times the 1-ton car (to follow Mr Calvert's figures) we would strongly urge that future additional sums required for road upkeep and extension are levied from the lorry sector and these can be calculated *pro rata* on axle load capacity.

This might do a little to ameliorate lorry/private car relations although in USA the truckers are still so sensitive on this subject that they frequently carry prominent tailboard notices stating the amount of tax paid for the current period.

Notwithstanding the progress made in Britain and US with electric and steam turbine-driven road vehicles, there is movement back to the rail and inland water transport in both these countries.

The impetus in the case of the US seems to have been mainly atmospheric pollution by road vehicles, but in Britain the arrival of the super-lorries (juggernauts) from the Continent in England's narrow country roads and lanes has brought pollution by vibration and actual collision with buildings, and this is what is now spurring the back-to-rail-and-canal movement.

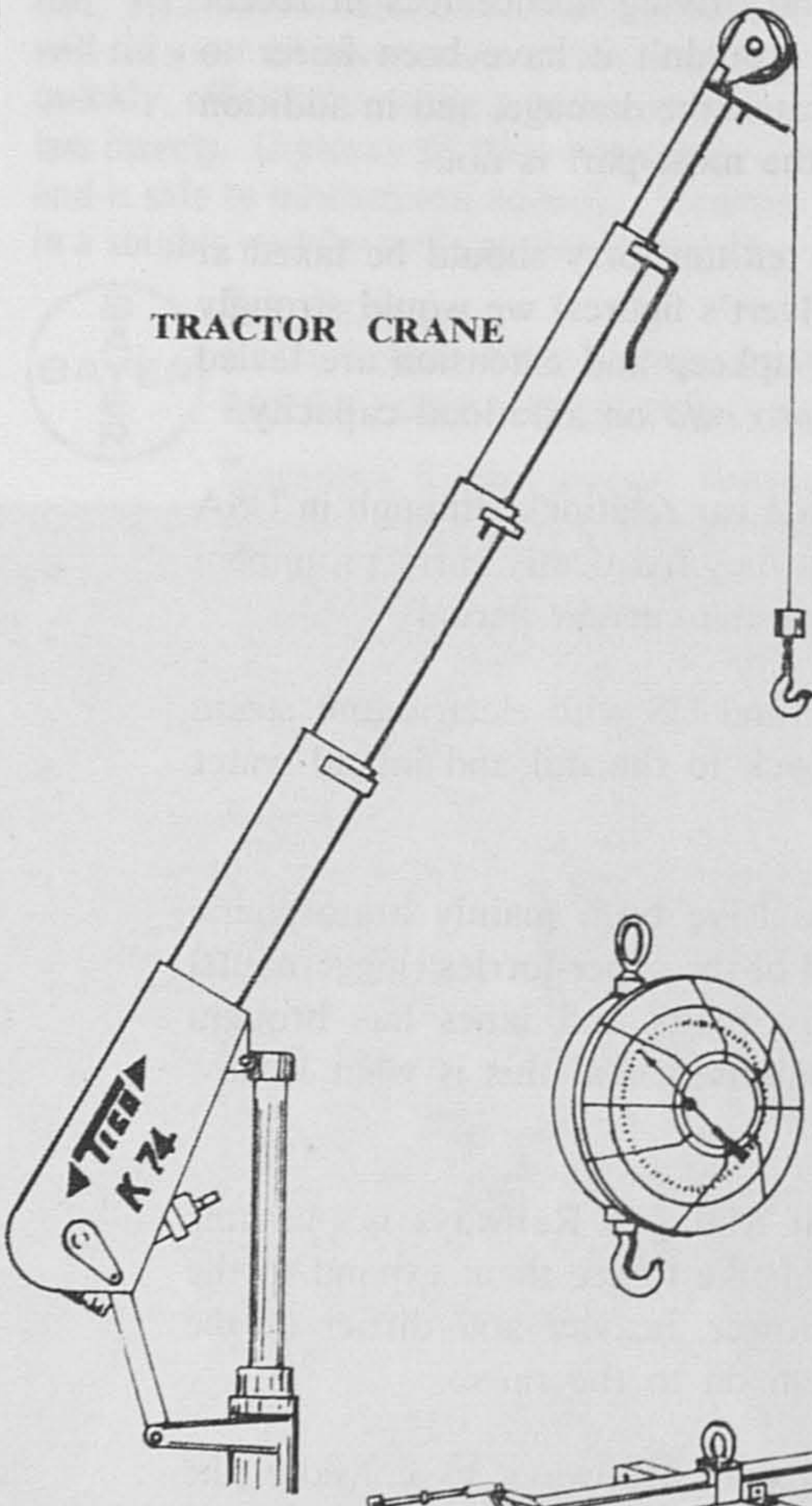
All this makes it more cheering to hear that Malayan Railways is planning expansion! We wish them every success and would like to see them expand to the extent that our legislators can at least ban the slower, heavier and dirtier of the long-distance loads from the roads and order them on to the rails.

Whilst on this subject, we should like Malayan Railways to consider the introduction of the fast railcar between the main services, as in West Sabah. This would surely facilitate a much better service to the public, and the Kota Bharu-Kuala Lipis line suggests itself as a good starting point for drumming up more public support through the provision of a better service, *via* the railcar.

Maju-lah Keretapi Tanah Melayu! May we hope that you and all other railways will benefit from the grim experience of Britain whose drastic, retrogressive cutting-down of rail facilities is now the subject of such bitter regret.

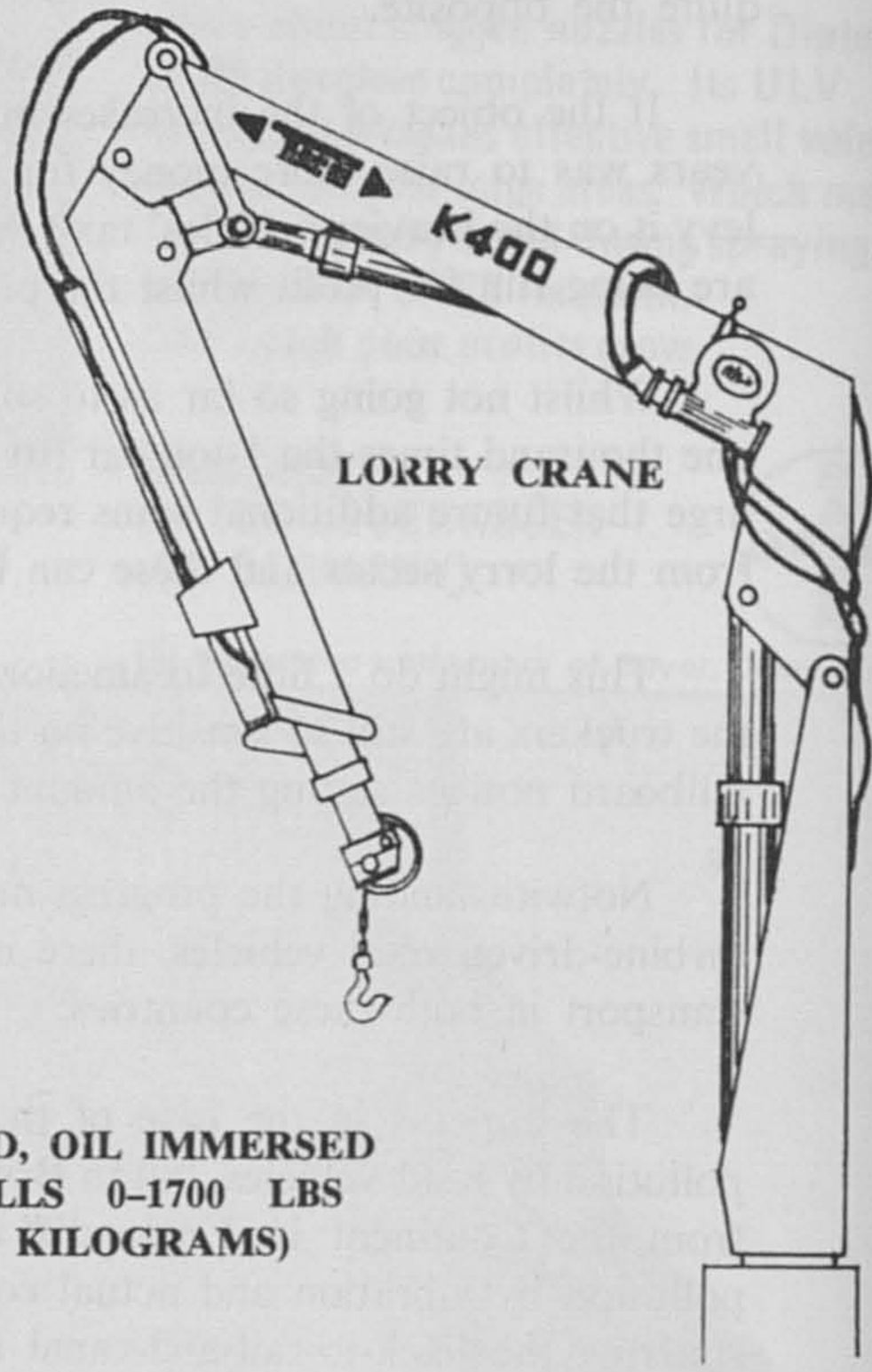
K74 TICO HYDRAULIC CENTRE MOUNT & REAR MOUNT TRACTOR CRANES.
K400 TICO HYDRAULIC LORRY CRANES — ALL WITH BUILT IN HYDRAULIC WINCHES AND 360° UNRESTRICTED SLEWING. ALL SPECIFICALLY DESIGNED FOR HANDLING FFB IN NETS OR CONTAINERS.

TRACTOR CRANE

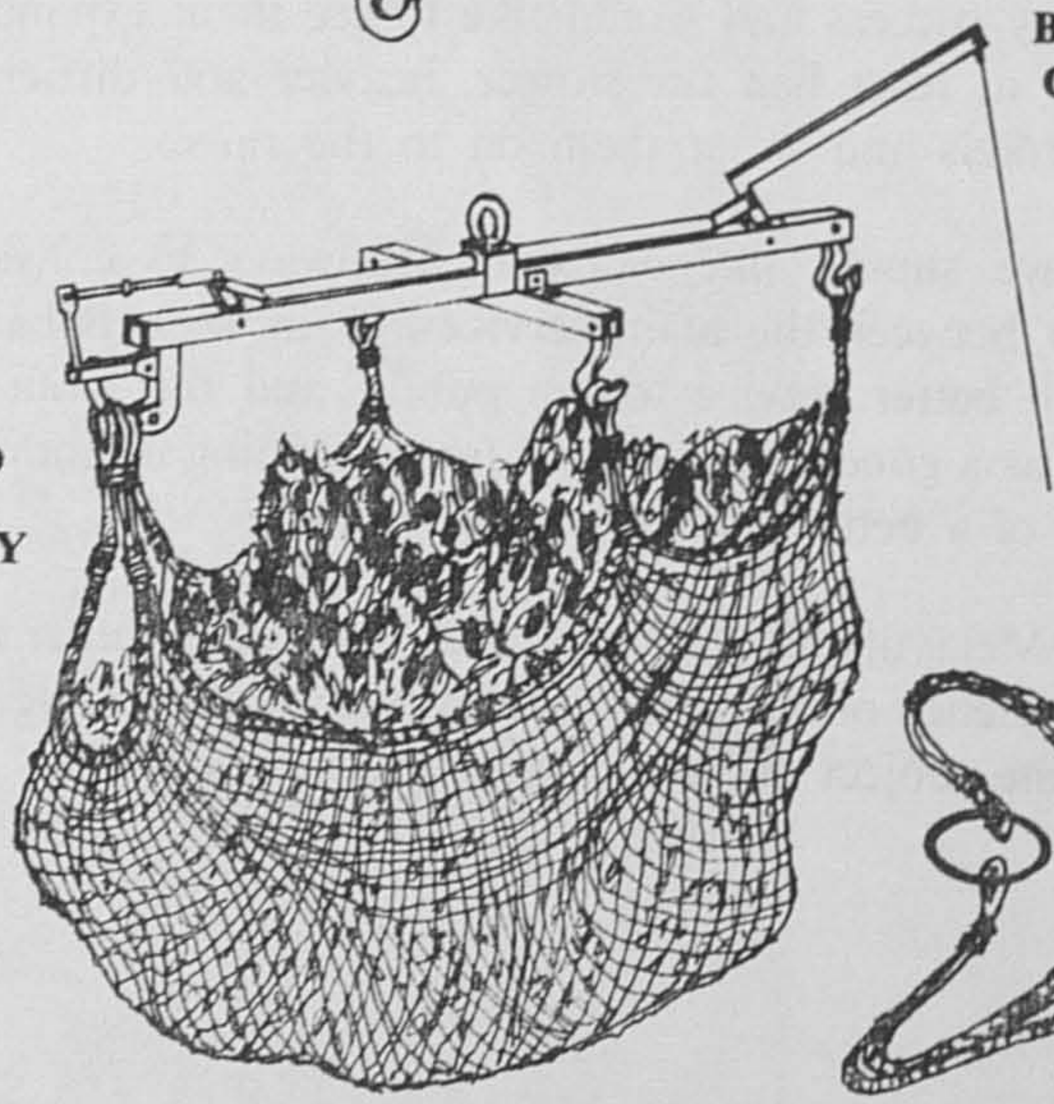


ARMOURED, OIL IMMERSED LOAD CELLS 0–1700 LBS (OR IN KILOGRAMS)

LORRY CRANE

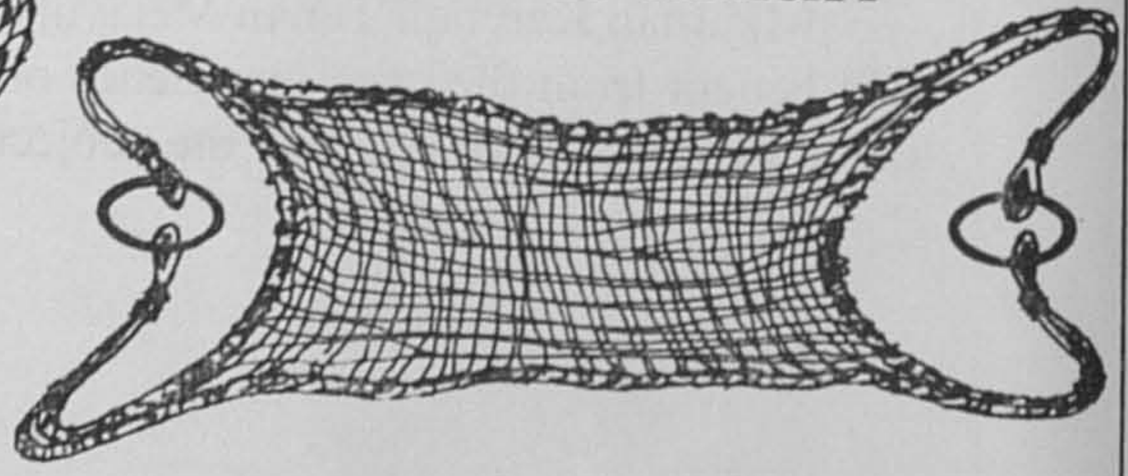


BRIDLE TIPPING GEAR FOR NETS



SIX CORNERED NETS MECHANICALLY EMPTIED

SQUARE NETS LINED OR UNLINED –1500 LBS CAPACITY



LAWS ENGINEERING SDN. BHD.

18, LORONG TIMOR, PETALING JAYA,
SELANGOR, MALAYSIA.

TEL. 53543

A race for survival

LaMont C. Cole

From his earliest appearance on earth, writes the author, man has been tampering with his environment. But only in the 20th century have the mounting pressures of population and technology raised the question of man's very survival.

Dr. LaMont C. Cole is professor of ecology at Cornell University and a member of the advisory commission on environmental biology of the National Science Foundation. He has served as president of the Biophysical Society and the American Institute of Biological Sciences. His writings range over the fields of ecology, population, and biomathematics. He was most recently a member of the federal commission on pesticides which recommended a ban on the use of DDT because of its long-range effects on plant and animal life. His article is reprinted from *Population Bulletin,* and has been made available to us through the United States Information Service.

Man is changing the world environment. He has been doing this almost from the time of his appearance as a new species a million or so years ago, but now he has become so numerous and technologically adept that there is a real danger he may destroy the ability of the earth to support life.

Early man subsisted by gathering wild foods and by hunting and fishing. At some point he discovered that he could use fire to drive game animals, and this was the start of man-made air pollution and soil erosion. However, early man was incredibly lucky. In many places the forests he burned were replaced by grasslands which supported increased populations of grazing mammals, and these grasslands developed soils that would eventually place them among the world's most valuable lands for agriculture. Although the evidence is lost in the past, man's first use of grasslands was probably for the grazing of domestic animals, and this grazing probably helped to inhibit the regeneration of forests.

Early agricultural man would have found it virtually impossible to cope with the heavy sod of grasslands, and so he confined his efforts to the flood plains of rivers where the soil was fertile, well watered and easy to cultivate with simple tools. He learned to store food so that the produce of the growing season could support him and his domestic animals throughout the year. Then he started to build towns and cities and to expand his numbers, and he felt the need for more agricultural land and year-round agriculture. These needs were satisfied by building dams and canals for irrigation. Great civilizations grew up in the valleys of rivers such as the Tigris, Euphrates, Nile, and Indus, and their human populations multiplied.

The Ravaging of Resources

There were, however, side effects. The very crowding of people into towns and cities exposed them to frequent epidemics, and these, together with wars and famines, took a frightful toll of human life. The smoke from man-made fires polluted the atmosphere, and the erosion of soil from burned-over and over-grazed slopes polluted bodies of water and sometimes blocked streams to create swamps and marshes with attendant health hazards such as malaria. At this stage man could not

anticipate the disasters that his own activities were bound to create. Without adequate drainage, for instance, his irrigation works would cause water to move upward through the soil, where it would evaporate and deposit a fertility-destroying layer of salts on the surface.

As soils were rendered lifeless by salts and as irrigation systems filled with silt, great civilizations vanished. Pliny tells of the farmers of the great Babylonian Empire, dating from before 2000 B.C., who harvested two annual crops of grain and grazed sheep on the land between crops. Today less than 20 percent of modern Iraq is farmed. The landscape is dotted with mounds representing forgotten towns, the old irrigation works are filled with silt (the end product of soil erosion), and the ancient seaport of Ur is now 150 miles from the sea with its buildings buried under silt as deep as 35 feet.

We hear a great deal today about the "underdeveloped" and "developing" nations but, as in the case of Iraq, many of them could more accurately be described as *overdeveloped* nations. Modern Iran was once the seat of the great Persian Empire where Darius I was the "King of Kings" 2400 years ago. Ancient Greece had forested hills, ample water and productive soils, and it is clear from Plato's *Critias* that he knew that deforestation and overgrazing could cause soil erosion and the drying up of springs. Apparently nobody listened to his warnings.

The glories of ancient Mali and Ghana in West Africa were legends in medieval Europe. In the land that once exported the cedars of Lebanon to Egypt, the erosion-proof Roman roads and the soil beneath them now stand several feet above the rock desert. In China and India, ancient irrigation systems stand abandoned and filled with silt. India, two centuries ago, had a population of about 60 million. Today it is over 500 million and most of its land problems have been created in the past century through deforestation and plowing and the resulting erosion and siltation, all stemming from efforts to support such fantastic population growth.

Everyone knows about the wonders of ancient Egypt. The annual spring flood of the Nile watered and fertilized the soil, and crops could be grown for seven months each year. Extensive irrigation systems were established before 2000 B.C. The country was the granary of the Roman Empire, and agriculture flourished for

Everything seems to foretell that Man, the last comer to this earth, will be the first to leave it.

Maurice Maeterlinck, poet and dramatist

nearly 4000 years. But in 1902 a small dam was built at Aswan to prevent the spring flood and permit year-round irrigation. Now the soils are deteriorating from salinization. The new Aswan high dam is designed to bring another million acres of land under cultivation; but the resultant deterioration of the soil may prove disastrous. Meanwhile, population growth has virtually destroyed any possibility that the new agricultural land can significantly raise the per capita level of nutrition.

Erosion in the Americas

In various parts of Central and South America, modern aerial reconnaissance has revealed ancient ridged fields on flood plains. These are the remnants, according to J.J. Parsons and W. M. Denevan, of "a specialized system of agriculture that physically reshaped large parts of the South American continent." In many parts of Mexico towns that were originally located to take advantage of superior springs now must carry in water from distant sites. And in Guatemala and Yucatan the ruins of the Mayan civilization stand as stark evidence of what the land was once capable of supporting.

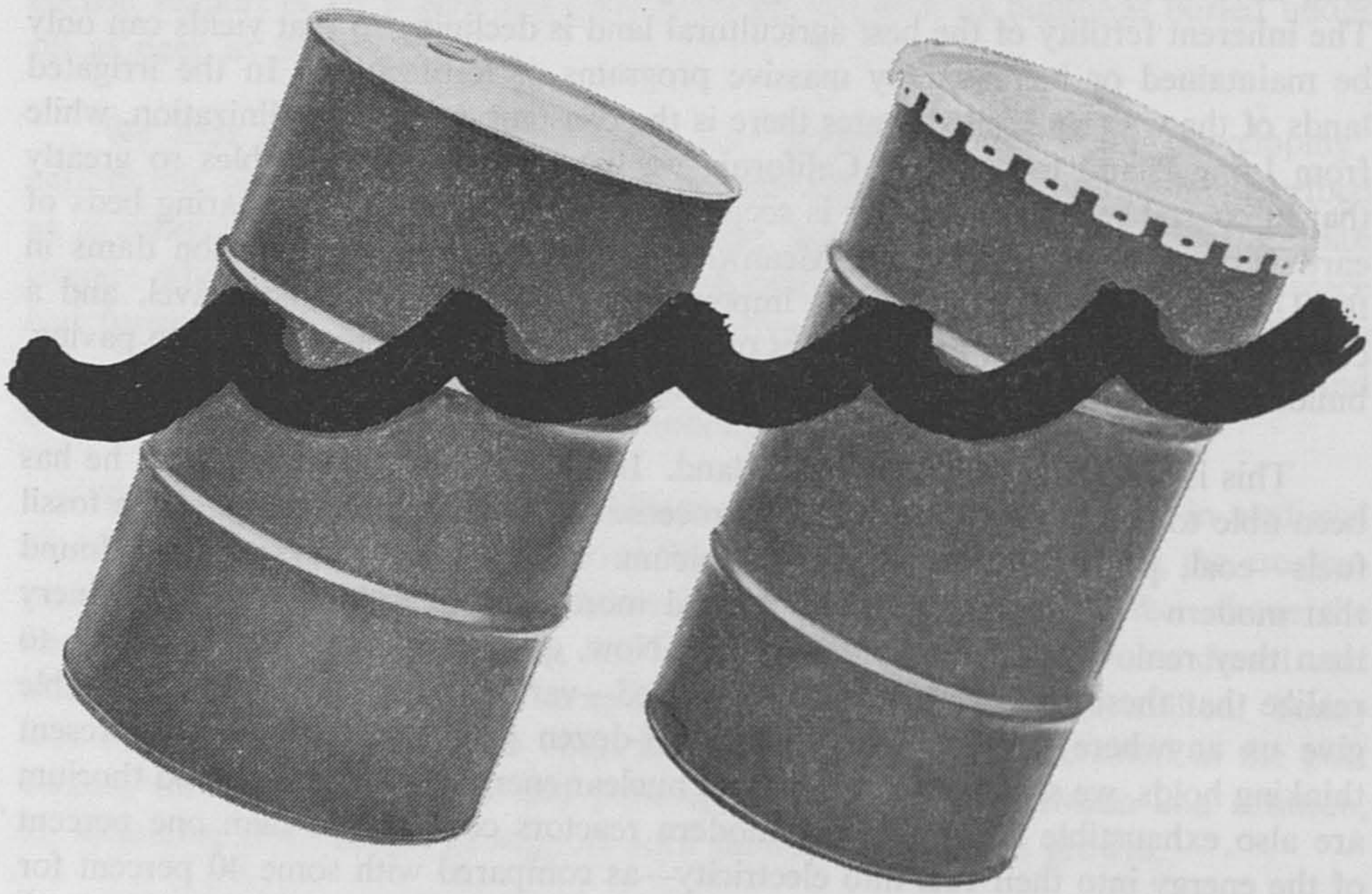
In the comparatively young United States, thousands of acres of agricultural land have been lost to erosion and gullying, and thousands more to strip mining. The inherent fertility of the best agricultural land is declining so that yields can only be maintained or increased by massive programs of fertilization. In the irrigated lands of the western United States there is the constant danger of salinization, while from Long Island to southern California we have lowered water tables so greatly that in coastal regions salt water is seeping into the aquifers (water-bearing beds of earth, gravel, or porous stone). Meanwhile, an estimated 2000 irrigation dams in the United States are now useless impoundments of silt, sand, and gravel, and a conservatively estimated million acres of land per year are being sacrificed to paving, building, and other manifestations of "progress."

This is what man has done to the land. In the last 300 years, moreover, he has been able to accelerate his destructive processes by obtaining energy from the fossil fuels—coal, peat, natural gas, and petroleum. Several recent surveys have found that modern "progressive" farmers expend more calories running their machinery than they remove from the land in crops. Now, quite suddenly, man has come to realize that these fuels will soon be exhausted—various estimates of the time-table give us anywhere from 20 years to a half-dozen generations. By then, present thinking holds, we shall have converted to nuclear energy. But uranium and thorium are also exhaustible resources, and modern reactors convert less than one percent of the energy into their fuel into electricity—as compared with some 40 percent for conventional plants burning fossil fuels. Indeed, the nuclear age threatens us with a wholly new magnitude of global contamination.

The Growth of Pollution

Like soil erosion and deforestation, man-made pollution has an ancient history. Neolithic man started polluting the environment with his fires, though the major resulting pollutants—smoke, soot, silt—also existed without man. But many new pollutants appeared as civilization advanced. The Romans mined lead in Britain and smelted it there, and it is said that the sites of these old smelting operations can still be recognized by the impoverished vegetation growing on the poisoned soil. In Rome the lead went into paints, water pipes, and the lining of vessels in which wine was stored. Recent studies of Roman bones have shown concentrations of lead which indicate that many members of the upper classes must have suffered from lead poisoning; it has even been suggested that this may have contributed to the decline of the Empire.

If you're looking for containers that either keep liquid in or keep it out...



Rheem Hume steel drums work both ways

With Rheem Hume steel containers, you can be sure that your product is kept completely intact. Because Rheem Hume steel drums and pails are top quality containers – with different internal linings to suit any product. Whether its packing liquids or solids, you can trust Rheem Hume for the protection you want.

Rheem Hume **the name you can trust**

Singapore: 31 Hill View Avenue, Singapore 23. Tel: 666333
Malaysia : 5th Mile, Kajang Road, Banting. Tel: Banting 254

As cities grew they began to concentrate materials produced over a wide area into a small space, and as these materials gave rise to wastes, pollution problems arose. Otto of Freising's *Chronicon* tells us that when Frederick Barbarossa's army arrived in Rome in the summer of 1167: "……the ponds, caverns, and ruinous places around the city were exhaling poisonous vapors, and the air in the entire vicinity had become densely laden with pestilence and death." Waters were also polluted. The name "Rhine" was supposedly derived from the German word for "pure", but by the 13th Century St. Hildegard wrote that the Rhine's waters, if drunk unboiled, would "produce noxious blue fluids in the body."

Man added a whole new dimension to environmental pollution when he started burning fossil fuels for energy. In the year 1306 a citizen of London was tried and executed for burning coal in the city, but three centuries later coal combustion was a way of life and London had a smog problem. This new source of energy made it possible for many more people simultaneously to inhabit the earth than ever before, and the resulting colonization and exploitation of new lands further aggravated environmental deterioration.

With the start of the 20th century, petroleum assumed a growing role as a source of energy. The internal combustion engine and a huge, diverse chemical industry have released into the environment countless new materials to which the world's living things have never before had to adapt. Miraculously, man's run of blind luck

Some say the world will end in fire,
Some say in ice.
From what I've tasted of desire
I hold with those who favour fire.
But if it had to perish twice,
I think I know enough of hate
To say that for destruction ice
Is also great
And would suffice.

Robert Frost

has continued—and the biogeochemical cycles on which his life depends have kept on functioning. But in the last three decades man-made stresses on the environment have so intensified that it would be incredible if such luck long continued.

The pollution problem, of course, is not limited to the by-products of our commercial activities. Waste matter is also a major culprit. We have continued to dispose of our wastes as of old—largely by dumping them into the atmosphere and hydrosphere—and human populations are now so dense that it is difficult to see how we can ever reclaim a clean environment.

Because of these biological wastes and other pollutants, it has been estimated by the U.S. Food and Drug Administration that we are now exposing ourselves and our environment to over a half-million man-made substances, and that this number is growing by between 400 and 500 new chemicals per year. Just in the past 25 years we have asked the environment to cope with such unprecedented classes of materials as synthetic pesticides, plastics, antibiotics, radioisotopes and detergents.

The Oxygen Balance

The end of our production of novel chemicals is not in sight. No more than a minute fraction of these substances, singly or in combination, has been tested for toxicity to the marine diatoms that produce some 70 percent of the earth's annual supply of oxygen. Nor have they been tested for toxicity to the equally vital forms involved in the cycles of nitrogen and other essential elements.

For the continental United States I have attempted some calculations of the oxygen balance. I took the figures for production and imports of fossil fuels for the year 1966, corrected these for exports and non-combustible residence, and calculated the amount of oxygen that would be required for their combustion. Then I made what I believe to be a good estimate of the amount of oxygen produced by photosynthesis within U.S. borders that year. The amount of oxygen produced turned out to be not quite 60 percent of the amount consumed.

The implication is clear: we are absolutely dependent on oxygen which is produced outside U.S. borders—mostly in the Pacific Ocean and brought in by atmospheric circulation. If we should inadvertently kill enough marine diatoms or the organisms they depend on for fixed nitrogen, we would start running out of oxygen to breathe. Yet these organisms are now being exposed to our half-million chemicals. There is some evidence that the insecticide DDT can suppress photosynthesis in bodies of water, and this chemical has now become world-wide in distribution. More frightening yet are the herbicides or "weed killers"—chemicals specifically designed to be poisonous to plants. The fate of Lake Erie and many lesser bodies of water has shown that man is capable of blocking the oxygen cycle through sheer carelessness.

Our Contaminated Air

Most textbooks describe the atmosphere as it would exist if it were free of contaminants. In our actual atmosphere, however, more than 3 000 foreign chemicals have been identified. The air of our cities is rich in solid matter such as soot, fly ash, particles of rubber from tyres and asbestos from brake linings—all of which have implications for public health. Our smoke stacks and exhaust pipes pour forth carbon monoxide, sulfur dioxide and various oxides of nitrogen; these chemicals can affect health and, in the case of the sulfur and nitrogen oxides, they are capable of corroding metal and concrete.

In addition, ethyl gasoline causes our automobiles to release so much lead to the atmosphere that snow near the North Pole contains 300 percent more lead than it did in 1940. And, to increase agricultural output, we have processed phosphate rock into fertilizer, releasing as a by-product poisonous flourine which ironically sometimes kills vegetation and livestock in the vicinity of the fertilizer plants. Ironically also, our laundry detergents are compounds of phosphorus, and we are discarding this precious element so recklessly that it has become one of our most significant water pollutants.

Isn't it time you got to know Chamberlain better?

Chamberlain: the largest Australian maker of tractors and agricultural equipment.

Chamberlain: big, powerful tractors, ready for any task. The Champion Mk III Industrial tractor is hauling up to 50 ton containers in the dockyards of Malaysia and Singapore. Fitted with the Dozer/Grader, the Champion Mk III meets the versatile needs of rubber and oil palm estates. Dozing, grading and hauling heavy fruits at the same time.

photo: Dozer/Grader at work on the Sungei Tong Oil Palm Estate, Trengganu

Chamberlain: tough machines for tough conditions. Impressive specification coupled to astonishing economy and reliability have proved the reason for their popularity.

And backed by WEALCO big 'W' service.

Isn't it time YOU got to know the **CHAMBERLAIN** better?

chamberlain



WEALCO

WEARNE'S EQUIPMENT AND LAND CO.(PTE) LTD
45, Leng Kee Road, Singapore 3. Tel: 632511
42, Road 31, Jalan Penchala, Petaling Jaya. Tel: 560349
Wearne's in Malacca, Seremban, Kuantan, Kota Kinabalu, Kuching, Tawau, Brunei.
Malayan Development Machinery in Ipoh, Butterworth, Sandakan, Miri.

the big W gives you big service

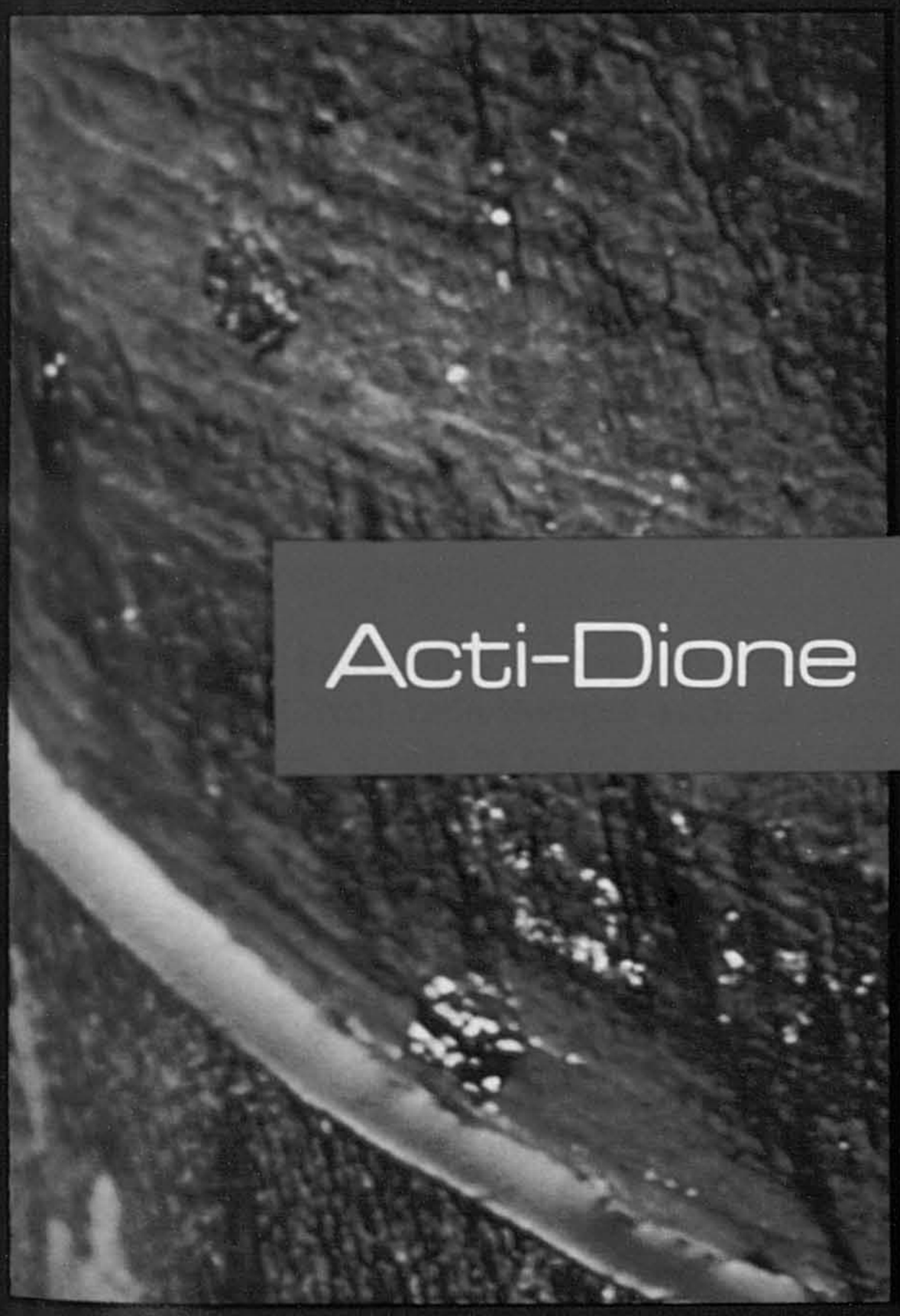
Acti-Dione attacks fungi from the inside.

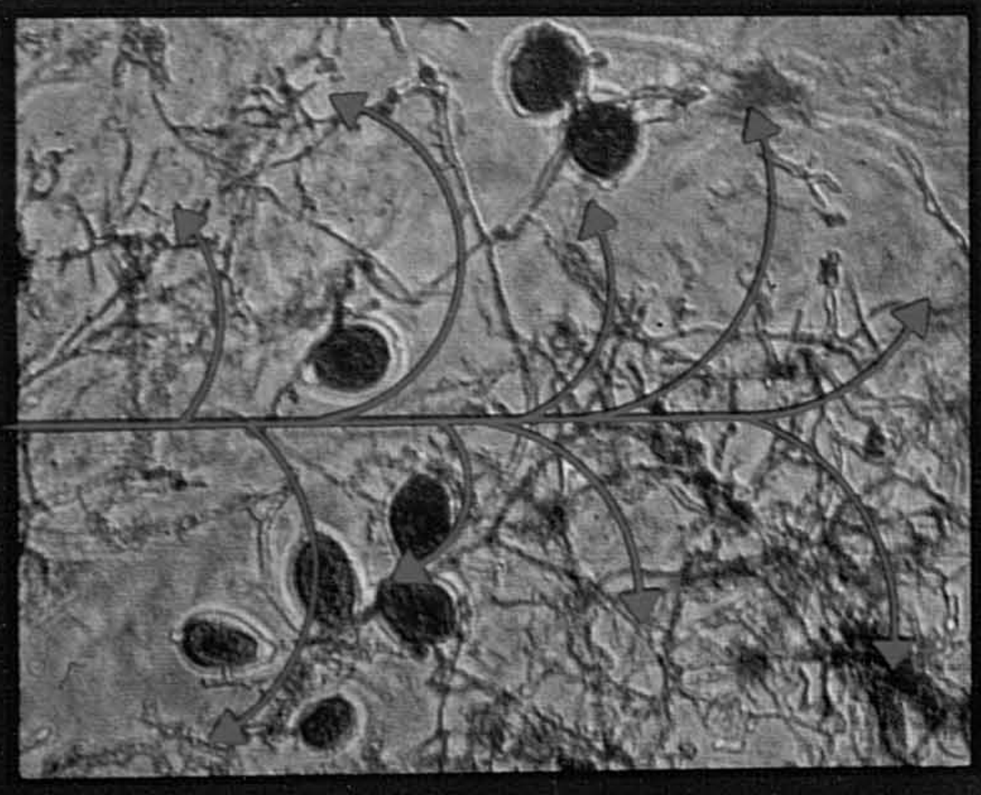
108-MS-AG(E)

Some fungi cause disease. Blackstripe and Mouldy Rot in rubber trees. Stem Canker in cocoa. If let alone they spread. Fast.

Control these fungi and you control the disease. Acti-Dione does it. It is an anti-biotic fungicide. It's a localised systemic fungicide, acting on the infected plant tissues. The fungi cells are selectively destroyed by Acti-Dione. Fast.

But get more details from your nearest Shell office. And remember: if you need a chemical — or you think there may be a chemical that might help you — call Shell Chemicals.





BLACKSTRIPE FUNGI—PHYTOPHTHORA PALMIVORA



MOULDY ROT FUNGI — CERATOCYSTIS FIMBRIATA

TUCO

A DIVISION OF THE UPJOHN COMPANY, KALAMAZOO, MICH, U.S.A.

Shell Chemicals

What about our over-increasing use of fossil fuels? We are burning them at a rate which is putting carbon dioxide into the atmosphere more rapidly than the oceans can assimilate it. Carbon dioxide is quite transparent to solar radiation but quite opaque to the longwave heat radiation from earth to space. In other words it creates a heat trap which has the potential for altering the earth's climates. The precise form that such changes might take are still very controversial and uncertain.

People are grasping at straws for ways to keep our economy growing. We are told that bacteria, fungi and yeasts will convert fossil fuels directly into food for man. Not only are fossil fuels exhaustible, but, unfortunately, this proposed new type of food production will not generate any oxygen.

The Problem of Radioactivity

We are told that nuclear energy will provide the answer to air pollution. This may be the cruellest hoax of all. Before the controlled release of atomic energy, the amount of radioactivity under human control consisted of about 10 curies, in the form of about 10 grams of radium divided among the world's hospitals and laboratories. Great concern and publicity arose whenever a few millicuries were

> **This curious world which we inhabit is more wonderful than it is convenient; more beautiful than it is useful; it is more to be admired than it is to be used.**
>
> **What is the use of a house if you haven't got a tolerable planet to put it on?**
>
> **Henry David Thoreau**

lost or misplaced. Those who can recall this concern will not take lightly the news that a nuclear power plant now being constructed on the shores of Lake Ontario near Oswego, New York, will, by the company's own estimate, release 130 curies per day into the atmosphere. And this plant is actually to be a small one in terms of present dreams.

Present-day reactors produce prodigious quantities of extremely hazardous and long-lived radioisotopes such as Strontium 30 and Cesium 137 which, everyone agrees, should be stored for at least 600 years before being released into the environment. Yet the Atomic Energy Commission found that about 5 percent of the underground storage tanks were leaking after only about 20 years.

In all of the foregoing instances of pollution the fundamental problem, as I see it, is our fetish for equating growth with progress. Economists state that companies must grow to survive. We take pride in a gross national product growing at between 4 and 5 percent per year, and we try to ignore the fact that our per capita production of trash is growing at about the same rate. We are told that our electrical generating capacity must increase by 10 percent per year, but we forget that all of that energy must eventually be imposed on the environment as heat; I don't believe that there is any way short of repealing the laws of thermodynamics to sustain such growth without bringing disaster to our environment.

Thiodan®

modern and safe insecticide for control of Oil Palm Bunch Moth (Tirathaba Mundella) and Nettle Caterpillars.

Morocide®

speciality for control of Oil Palm Spider Mites: simultaneously effective against powdery mildew.

HOECHST MALAYSIA SDN. BHD.

Agricultural Dept.

Kuala Lumpur Penang Kota Baru Kulai

Population and Pollution

In a related field, growing populations are viewed by many planners simply as expanding markets—and here we come to a fundamental problem. There must be *some* level of human population that the earth could support indefinitely without undergoing deterioration, but we don't know what that level is. Through the first million or so years of man's existence, his population probably doubled no more often than once in every 50 000 years. During the summer of 1968 the human population passed the 3.5 billion mark, and, if present trends should continue, this population would double again every 35 years! There is no possibility that the earth's environment can long sustain such pressure; in fact I consider it very improbable that the earth could continually support, on a nondestructive basis, a population as large as the *present* one. We shall have to decide, and soon, what quality of life we want for ourselves and our children, and what steps in pollution and population control are necessary to get it.

Unfortunately, our big decisions are made on economic grounds. Factories burning fossil fuels don't *have* to release particulates and sulfur and nitrogen oxides into the atmosphere; nor do nuclear plants, barring accidents, *have* to release radioisotopes into the environment. They do these things because it could cost money not to. Pollution by automobiles could surely be controlled at some expense and perhaps with some loss of performance. There are valuable raw materials in discarded automobile bodies; if economics made the mining of fresh ore as expensive as reclaiming used metals, our auto graveyards would vanish. Throw-away glass bottles are the thing today, and federal law even prohibits the re-use of liquor bottles—thereby adding to the burden of trash. Even metal cans could have salvage value, as they did for a while during the tin shortage of World War II. The organic matter in garbage and sewage could be converted to fertilizers, but not at present competitive costs. Other wastes could be burned in smokeless incinerators and the heat could be made to do useful work, as is being done on a small scale in Europe.

Who Should Pay?

Influencing all the foregoing choices we might make is the question: *Who should pay for pollution?* Our system now allows the public utility, the manufacturer, the chemical company and the incinerating firm to dump pollutants into the air at little or no cost. Other people pay the bill: the city government which must repair its roads and bridges and replace its trees far too often, and the emphysema sufferer who must frequent a doctor's office. If the bills for pollution were handed back to the sources of pollution, we might see some surprising improvements in the quality of our air. But such a system of social accounting, I hasten to point out, involves political and ethical decisions rather than purely technological ones.

Meanwhile, we are on a collision course with disaster. It is encouraging to know that we already have, or can develop, the technology to reverse our course. But it is disturbing to realize that we have not yet applied this technology in an effective way. We know how to regulate population size and how to do it economically. We could control pollution and even do a great deal to clean up our filthy and deter-

iorating environment—provided, of course, that we have not already made disaster inevitable by dooming some species on which the continuation of life depends or by burdening ourselves with a load of defective genes that will make future human generations unviable.

Surely, man faces no more urgent problem than the need to save his environment. What will be required is intense collaboration by the best minds among biologists, physical scientists, sociologists, economists, political scientists, and policy makers. In the United States, as well as elsewhere, many of these people are beginning to recognize and deal with the critical problems of survival. We can only hope that enough time is left for them to do their work.

MAKE A DATE
WITH
INSTANT SERVICE!
AT
Mercantile Bank Limited
A MEMBER OF THE HONGKONG BANK GROUP

BRANCHES IN WEST MALAYSIA

BENTONG
BUTTERWORTH
IPOH
KOTA BHARU
KUALA LIPIS
KUALA LUMPUR
KUALA TRENGGANU
KUANTAN
MENTAKAB
PENANG
RAUB
SEREMBAN
TAIPING
TEMERLOH

WORLD WIDE BRANCHES AND CORRESPONDENTS

The ISP Schools Association

(Incorporated in Malaysia)

REPORT OF THE MANAGEMENT COMMITTEE FOR THE YEAR ENDED 31 DECEMBER 1972

There was a profit for the year 1972 of $8400.

Expenditure in 1972 amounted to $249 000 as against $286 000 in 1971. Income from school fees continued to fall due to fewer pupils and in 1972 was $251 000 compared to $278 000 in 1971. Due to the unremitting efforts of the Principal and backed up by our Secretary, Treasurer and Management Committee, expenditure was once again reduced considerably in 1972. This has been achieved without in anyway reducing standards at Uplands and indeed we believe that standards in 1972 are higher than in 1971. It is the constant aim of the Management Committee to provide the best possible education at the least possible cost and this we believe we achieved. Part of the reduction in expenditure was due to fewer pupils. The rest was due to a considerable reorganisation of the catering staff, gardeners and general domestic staff. The amount of equipment, text books and food bought for each child was in no way reduced, in fact more food was allowed per child despite continuously rising costs. Text books are constantly updated and additional books are purchased for the reference and fiction libraries each term.

During 1971 52% of the children attending Uplands were the children of Planters and Miners. The figure for 1972 fell again to 47% but this steady downward trend is to be expected with Malayanisation. It is interesting to note that the proportion of miners' children rose from 12% in the first term to 18% in the third term of 1972. It is with regret though that we hear of children of expatriate planters being driven as much as fifty miles a day, each way, to attend a day school. This is in spite of generous education allowances from companies for attendance at Uplands and the appalling hazards these children must face daily on the roads. We appreciate parents must have a free choice of education but this is not the way for Planters to support their school, to use it only when forced to.

The main worry of those concerned in the running of Uplands is the number of pupils. We know we have an excellent school. The totally unfounded rumours of immediate closure have abated somewhat but have far from ceased. Uplands has the most excellent teaching staff who give most loyal service. However, rumours circulate constantly that our staff are always changing. This is quite the opposite of the truth. Only one permanent teacher in the last five years has served for less than two years at Uplands. Many have served for very much longer periods and continue to serve us. This record is probably unique in Malaysia compared to other expatriate schools where constant staff changes are the norm. As long as these sort of rumours persist pupils will be hard to find. Please could we appeal to all parents, not just Planters and Miners, to give us their whole-hearted support.

ONLY OUR NAME HAS CHANGED.
NOT OUR REPUTATION.

With effect from 15, May, 1973 ANSUL (MALAYSIA) SDN. BERHAD changed its name to ANCOM SDN. BERHAD.

ANCOM SDN. BHD. will continue the successful manufacturing and marketing policies of ANSUL, supplying weedicides to rubber, oil palm, coffee and cocoa industries in Malaysia.

Our company's change of name is a change in name only.

Our outstanding record of international and regional expertise, which has greatly benefited all users of ANSUL products in the past, will continue to benefit all users of ANCOM products in the future.

ANCOM SDN BERHAD: A MEMBER OF THE ANSUL GROUP OF COMPANIES



ANCOM
SDN. BERHAD

In 1972 Miss Shotton left to take up an appointment as Head of Milbourne Lodge School, a leading boys pre-preparatory school in Surrey. Mr P.E. Drury replaced Miss Shotton as Principal. Mr Drury with his very wide experience in preparatory schools and using the foundations of the new syllabus laid down by Miss Shotton in 1971 continued to update teaching methods at Uplands. Our staff methods and equipment are such that we can enter suitably gifted children for scholarships and have recently done so successfully. All children entered for the Girls Common Entrance in 1972 passed into schools of their first choice. Others doing school entrance exams and tests all passed successfully.

We heard with much delight that Stephen Butterworth an old boy of Uplands, now eighteen and at Kings School, Rochester, is a member of the Kent County Junior Athletic team. Stephen beat the Junior British hurdling champion at Crystal Palace last Summer and has been short-listed for training for the next Olympic Games. Stephen does his 'A' levels this summer and plans to be a teacher.

Once again I must thank the Principal, the Staff, our Secretary, Treasurers and the Management Committee for their great help and support during the year.

MRS. A. CRAWFORD,
Chairman,
Management Committee,
I.S.P. Schools Association.

21 May 1973.

INLAND & FOREIGN TRADING CO. (PTE.) LTD.
28, CAIRNHILL ROAD,
P. O. BOX 2098,
SINGAPORE 9.

Cable:
"IFTCO"
Singapore

Telephone:
377201/377840

PUERARIA JAVANICA
CALOPOGONIUM MUCUNOIDES
CENTROSEMA PUBESCENS
FLEMINGIA CONGESTA
STYLOSANTHES GRACILIS
DESMODIUM OVALIFOLIUM
CALOPOGONIUM CAERULEUM
TEPHROSIA VOGELII
TEPHROSIA CANDIDA
CROTALARIA STRIATA
CROTALARIA USARAMOENSIS
CROTALARIA ANAGYROIDES
CARPET GRASS SEED
COUCH GRASS SEED
KANGKONG (VEGETABLE SEED)
ALBIZZIA FALCATA
etc. etc. etc.

PRICES ON APPLICATION

Social and Personal

Awards of Associate Diploma

Chen Fai Kok	—	(Central Perak)
Chong Kem Yee	—	(Malacca/Muar)
Chow Kok Choy	—	(Kelantan/Trengganu)

EXAMINATION SUCCESSES

Estate Practice (Rubber)

14 March 1973

Siew Mun Chee	—	(Selangor)	Passed
Lye Soo Lee	—	(Kedah/Penang)	,,
Chow Kok Choy	—	(Kelantan/Trengganu)	,,
Chen Fai Kok	—	(Central Perak)	,,

Estate Practice (Oil Palm)

14 March 1973

Mahbob bin Abdullah	—	(Central Johore)	Passed
Au Yong Siew Fah	—	(Central Johore)	,,
Chong Kem Yee	—	(Malacca/Muar)	,,
Lee Khik Tiong	—	(Sabah–Tawau)	,,

Births

STILES: To John and Jane, a son Rory John in Cheshire, U.K., on 28 February 1973.

WOODWORTH: To Maggie and Peter a son Christopher John brother to Jessica Anne at Assunta on 15 June 1973.

On leave

3469 Eakin, T R D, c/o 14 Clappentail Park, Lyme Regis, Dorset, England.

4047 Sergeant, C J, NDA, AISP, 5 Copse Close, Liss, Hants, England.

Returned from leave

4616 Boardman, D J, AISP, West Country Estate, Kajang, Selangor.

5559 Clegg, A J, Oil Palm Research Station, P O Box 207, Banting, Selangor.

3786 Evans, R C, Sepang Estate, Sepang, Selangor.

4160 Lumsden-Bedingfeld, R W, Kupang Estate, Baling P O, Kedah.

4675 Milne, G M, Welch Estate, Jementah, Johore.

4171 Williams, H O, Pengkalan Bukit/Temiang Renchong Estates, Panchor, Muar, Johore.

5729 Peters, E W, Sabah Land Development Board, Nangoh Scheme, P O Box 1253, Sandakan, Sabah.

Now with a red dye for better supervision



Increase Your Profits with Ethrel™ Latex Stimulant ....in the new, red formulation

Easier Supervision of Application:
The ready-to-use formulation of Ethrel Latex Stimulant was designed to be rapidly taken up by the tree as a precaution against loss of chemical due to rain. Many rubber planters have pointed out, however, that as a result of this desirable feature, supervision of application was sometimes difficult. In response to the many requests from the rubber industry, a red colouring agent has now been added to Ethrel Latex Stimulant. This new formulation has been fully tested in the field for one year, and will not stain latex when properly used.

Easier Application:
The painting characteristics have been improved in the new, red formulation of Ethrel Latex Stimulant, permitting easier application. As a result of this, a wider range of application rates, using standard application techniques, is now possible.

Enhanced Effectiveness:
One year of comparative trials at many locations has demonstrated that the new, red Ethrel Latex Stimulant is generally more effective than the previous formulation and there has not been the slightest sign of any deleterious effects arising from its use.

Product Stability :
Ethrel Latex Stimulant is a ready-to-use formulation and is completely stable. The mixture contains 10% acid equivalent by weight as recommended by the RRIM.

High Yield Increments:
Sustained yield increases of 50—140% had been obtained from such clones as PB 86, Tjir.1, PR 107, RRIM 600 and clonal seedlings. Consult your planting adviser about treating trees less than 15 years old with Ethrel Latex Stimulant.

Above-the-cut Applications:
It is sometimes highly profitable to apply Ethrel Latex Stimulant, monthly or bi-monthly, to the panel above the tapping cut. At present, recommendations for above-the-cut applications are limited to trees where the renewing bark will not again be tapped, or where existing bark is too thin to scrape. Consult your planting adviser for further information.

Easy to apply:
ETHREL Latex Stimulant is ready for brushing onto the scraped bark without further preparation.







Marking:
Equivalent to 2 months' bark consumption.

Scraping:
With renewed bark, scrape to the pink layer; with virgin bark, remove the extra (white) layer for quick penetration.

Applying :
Apply ETHREL Latex Stimulant evenly onto the scraped bark with a flat 1½" paint brush.

Free Technical Advisory Service :
Our Advisory team will be pleased to call upon you and assist with your ETHREL programmes.
Contact us at: Harrisons & Crosfield (M) Sdn. Berhad. All branches.

Sole Agent:
HARRISONS & CROSFIELD
(M) SDN. BERHAD

A Product of
AMCHEM PRODUCTS, INC.
INTERNATIONAL DIV. AMBLER, Pa.

Change of address

4227 Barnwell, I M, AISP, New Britain Palm Oil Dev Ltd, P O Kimbe, West New Britain, Territory of Papua, New Guinea.

4709 Benton, A A, 49 Binghill Park, Milltimber, AB1 OEE, Aberdeenshire, Scotland.

4715 Benton, D M, Landak Estate, Paloh, Johore.

5415 Cawkwell, B K 'Merivale', Bigby Road, Brigg, Lincolnshire, England.

3741 Colling, J E, Sedgley Estate, Kajang, Selangor.

5466 Dunk, P H, Bukit Kraiong Palm Oil Mill, Bukit Kraiong Road, Kapar, Selangor.

5977 Foo Chee Seng, Landak Estate, Paloh, Johore.

2768 Gardner, J R, 20 Landsdown Place, Cheltenham, Glos, England.

5277 Gill, D S, Kulai Oil Palm Estate, P O Box 108, Kulai, Johore.

5369 Goh Boon Peng, Kulai Oil Palm Estate, Midland Division, Kulai, Johore.

4550 Kam Cheng Eng, AISP, No. 14 Jalan Ketumbar, Taman Cheras, Jalan Cheras, Kuala Lumpur.

5486 Lim Heng Heng, Lum Trading Co Sdn Bhd, P O Box 7, Segamat, Johore.

5113 Md Taib b Hassan, Sungai Mengah Estate, P O Box 29, Segamat, Johore.

4935 Mohd Zaini b Haji Abdul Rahman, Mentakab Estate, Mentakab, Pahang.

4979 Ong Beng Kee, AISP, Paya Kamunting & Riverside Estates, Jitra, Kedah.

5498 Riehle, Guenter (Dr), BASF Experiment Station, 6703 Limburgerhof, West Germany.

4077 Rosenquist, E A, Oaktree House, Hare Lane, Little Kingshill, Great Missenden, Bucks HP16 OEE, England.

4539 Subramaniam, K, Sungei Bekok Estate, Bekok, Johore.

2280 Tate, H L H, JP, The Woodbury Hotel, Lewes Road, East Grinstead, Sussex, RH19 3UD, England.

3781 Valda, R N de, 727 Remuera Road, Auckland 5, New Zealand.

5708 Vasudevan, K, Kuala Perak Estate, Teluk Anson, Perak.

5618 Yap Nyoke Yong, Tanjong Malim Estate Group, Tanjong Malim, Perak.

5425 Yapp Wui Hiong, Stephen, P O Box 411, Tawau, Sabah.

5575 Hardon, J J (Dr), Van der Have NV, Plant Breeding Station, Rilland (zeeland), The Netherlands.

4319 Jones, R K, AISP, 1C Jalan Bunga Hinai, Fettes Park, Penang.

5376 Lua Kim Hai, Kuala Gris Estate, Kuala Krai, Kelantan.

4607 O'Neil Roe, R I K, Goodyear/Mid-West Rubber Board Joint Venture, c/o Messrs Irving & Bonnar Solicitors, P O Box 829, Lagos, Nigeria.

5722 Varughese, K T, Sabah Land Dev Board, Sungei Manila Scheme, P O Box 1253, Sandakan, Sabah.

4815 Blincoe, A D, Sungei Mahang Estate, Nilai, Negri Sembilan.

4941 Brown, G E M, Holyrood Estate, Selama, Perak.

4839 Cooper, B C, AISP, Bute & Dominion Estates, Nilai, Negri Sembilan.

5771 Mok Chak Khuin, Nicholas, Syarikat General Agriculture, P O Box 99, Tawau, Sabah.

5452 Wastie, R L (Dr), FISP., c/o A L Wastie Esq., 35 Quartermile Road, Godalming, Surrey, England.

Years of persecution have made weeds sneaky!

If you have the feeling the weeds on your estate wait until you turn your back, then take over while you're not looking: you're right.

They do do that.

You need the kind of help we can offer. Our experts know all the weeds here. And how to mix a chemical "cocktail" that'll knock them out cold. For a nice long time.

We have Shellapon to destroy sheet lalang and Shell Lalang Oil for effective eradication of sporadic lalang to the tips of their roots. Shell Amine 80 to wipe out broad-leafed weeds, (though not around oil palms!) Tenac to make sprays stick. Teepol to make sprays spread. Diurex 1000 and Shell MSMA to complete your "cocktail" cabinet.

There isn't a weed smarter than our herbicides.

Call us to advise you on the "cocktail" mixture for your estate that will be the most effective and the most economical.

