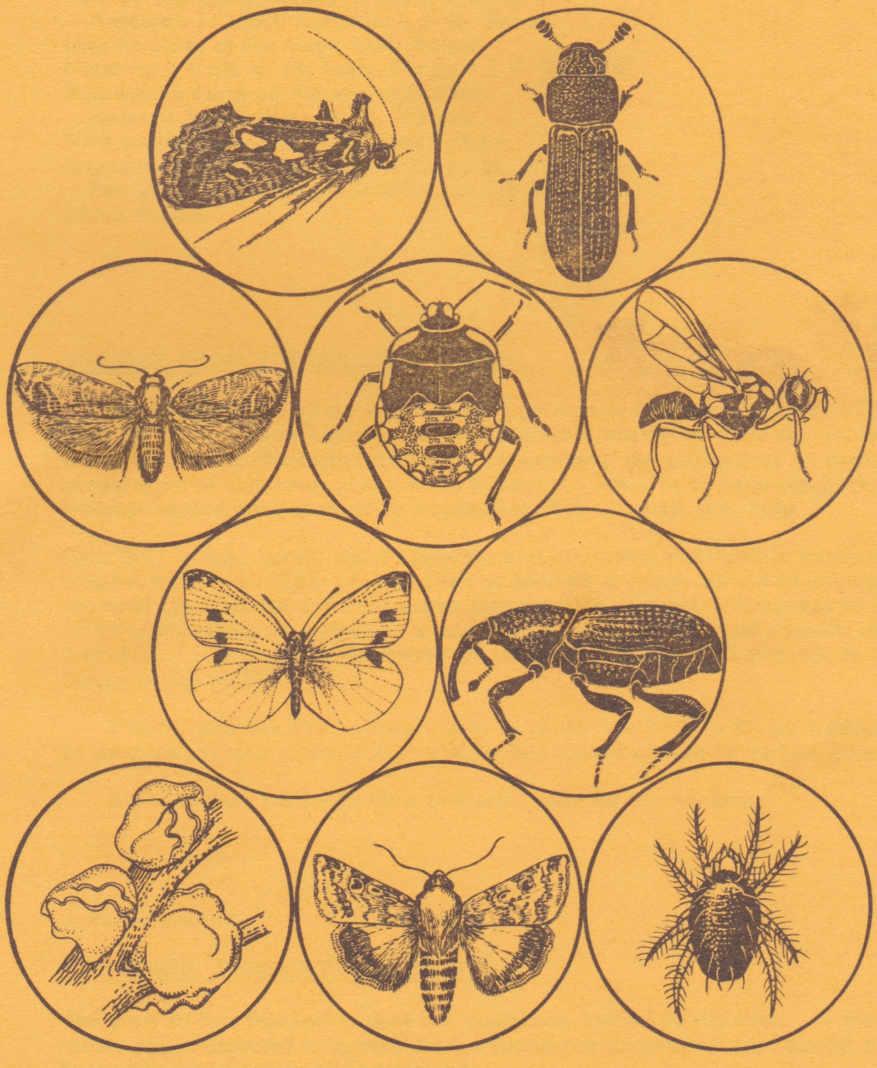
NEWS BULLETIN

ENTOMOLOGICAL SOCIETY
OF QUEENSLAND



PRICE 40c

Registered for posting as a periodical — Category B

Vol. 3 No. 2 March, 1975.

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MESSAGE FROM THE BULLETIN EDITOR

As the Convenor of the Publication Committee of the Entomological Society of Queensland for 1975, I have already received generous assistance from the Society's Council and from Mr. Geoff Monteith and Mr. Ian Naumann, my colleagues on the committee, in the preparation of this issue of the News Bulletin. We aim to keep the Bulletin as diversified, interesting and communicative as possible, but we need your help.

Articles, letters, notes, news clippings and any other publishable forms of contribution will be welcome. This year we plan to include a centre spread of photographs in several issues of the Bulletin and it is hoped that the first of these will appear in May. Black and white photographs of suitable size and with an appropriate brief caption should reach me by 16th May. The only major restriction on subject matter is that there be an arthropod somewhere in the picture!

The Publication Committee wishes to thank Sybil Monteith for working under pressure to produce the new cover design and for her expert advice on colour schemes.

We hope that 1975 will be a colourful year for the Society.

A.H.A. Bensink

CONVENOR, PUBLICATION COMMITTEE

THE PRESIDENT 1975

Society President, Mr. Tom Passlow, graduated from the Sydney University (B. Sc. Agr.) in 1948. Following twelve months as Lecturer in Botany and Entomology at Hawkesbury Agricultural College in N.S.W. he accepted appointment as an Entomologist with the Queensland Department of Primary Industries (then the Department of Agriculture and Stock).

Initially he was stationed at Toowoomba where he worked under the guidance of the late Dr. A.W.S. May. During this period he developed a keen interest in field crop entomology. His work on sorghum midge culminated in his admission to the degree of Master of Science in Agriculture in 1958. Part of the requirements for the degree was a thesis entitled "The Bionomics and Control of Sorghum Midge, Contarinia sorghicola (Coq.), in Queensland." The work primarily covered the importance of diapause in the seasonal cycle of the pest, the climatic impact on development from diapause and the significance of this fact in crop losses.

Following his period at Toowoomba he spent ten years as District Entomologist at Rockhampton and a further ten years as Senior Entomologist, again, at Toowoomba. His interests in field crop entomology continued during this period and tended to concentrate on cotton in which he studied the economic importance of Heliothis spp. and seedling pests to the industry in Queensland.

During 1970 the Department of Primary Industries sent him on a four months study tour of cotton and sorghum areas in U.S.A, Africa and India. The tangible benefit from the visit has been the development of studies toward host plant resistance tolerance in these crops in Queensland and an intensification of economic threshold and pest management studies in cotton and other crops.

Following the retirement of Dr. Alf Brimblecombe in 1973, Tom was appointed Director of the Entomology Branch in the Department. He is now, together with other officers of the Branch, looking forward to the completion and occupation of the new Entomology building at Indooroopilly later in the year.

Tom and his wife, Margot, are now living at Kenmore with their four children. Their eldest son, Simon, is studying Surveying at Q.I.T., Mark and Tim are at Kenmore State High School and Lisa ia a primary pupil at the Kenmore Convent School.

ANNUAL GENERAL MEETING

Minutes of the 1975 Annual General Meeting of the Entomological Society of Queensland held in Room 323 of the Agriculture and Entomology Building, University of Queensland on Monday, March 10, 1975.

Attendance: Mr. G.B. Monteith (President), Professor Kettle, Drs. Bengston, Bensink, Doube, Exley, Marks, Reye, Stone, Wharton, Woodward. Messrs. Brier, Cameron, Cantrell, Cunningham, Donnelly, Ferguson, Hancock, Hunter, Kay, Lambkin, Libke, McRae, Morgan, Naumann, Passlow, Postle, Pyke, Sabine, Spencer, Standfast, Storey, Swindley, Titmarsh, Toop, Webb, Wylie, Yule, Ms. Burrows, Castle, Edwards, Monteith, Youlton.

Visitors: Ms. Bengston, Libke. Messrs. Blackburne, De Baar.

Apologies: Drs. Campbell, Hassan, Macqueen. Messrs. Galloway, White.

Minutes: The Minutes of the 1974 Annual General Meeting were circulated in Vol. 2. No. 2 of March, 1974. It was moved by Mr. Wylie, seconded Mr. Yule, that the Minutes be taken as a correct record. CARRIED.

Nominations: The following nominations have been received for Ordinary Membership:

Mr. Murdoch De Baar, 25 Irwin Terrace, OXLEY. Q. 4075.	Nom. R. Yule Sec. R. Wylie	Mr. C.G. Trouton 30 Redwood St, Stafford. Q. 4053.	Nom. E.N. Marks Sec. T. McRae

Elections: Mr. J. Winter, nominated at the December meeting, was elected to Country Membership by show of hands.

Changes in Membership Status:

1. Change of Address
   Mr. T.V. Bourke, c/- United Nations Development Programme, Apia, Western Samoa.
   Dr. J. St. Leger-Moss, Butterworth Air Base, near Penang, Malaysia.
   Mr. M. Colbo, Dept. of Biology, McMaster University, Hamilton, Ontario, Canada.
   Mr. O. Fakalata, c/- Director of Agriculture, Box 14, Nuku'alofa. Tonga.
   Mr. L.A. Vella, 8 Cooma St, Fairfield, Sydney, 2165.
   Miss. P.M. Bowden, Dohles Rocks Road, Kallangur. Q. 4503.
   Mr. M.B. Malipatil, Dept. of Zoology, Victoria University, Wellington, N.Z.
   Mr. G. Maywald, 21 Mullins St, Paddington, Q. 4064.

2. Reclassifications
   Mr. D. Home to Associate Member
   Mr. O. Fakalata to Country Member
   Mr. V. Sucksoong to Associate Member

3. Resignations
   Mrs. H. Lahey
   Dr. W.A. Steffan
   Dr. B. Thistlethwaite

GENERAL BUSINESS:

1. Death. Members were asked to stand in silence for a short period in memory of Mr. R.A.J. Meyers who passed away recently. Mr. Meyers has been a long term member of the Society who worked at the Geigy Tick Research Station at Beenleigh.

2. Insect Export Legislation. Mr. Monteith reported that in response to the motion passed at the December meeting a letter of protest had been sent to the Minister for Science. A very encouraging reply had been received from the Minister in which he expressed interest in the matter and said that he believed that members of the scientific community involved in taxonomy should reach a consensus view and inform him accordingly before he considered in detail whether the Regulation should be retained, amended or repealed. Mr. Monteith said it was encouraging that the Minister was keeping repeal as one of his options.

Mr. Monteith then invited Dr. E.N. Marks to report on activities within the Australian Entomological Society with respect to the legislation, and in so doing he congratulated her on behalf of the meeting for her recent election to the presidency of the national Society.

Dr. Marks reported that late in 1974 there was action on several fronts. In the Australian Entomol. Soc. November News Bulletin, M. S. Upton suggested guidelines that recognized principles of scientific freedom; informal discussions took place between representatives of AES and of the Conference of Australian Museum Directors (CAMD); the Fauna Committee of the Australian Academy of Science met to consider the legislation; CAMD prepared revised Guidelines dated 16/12/1974 which it circulated to taxonomists, and which were also circulated by AES to its members for discussion at its AGM on 20th January. The AGM concluded that, although the limited support shown for the legislation did not justify its continued existence, repeal in the present circumstances might be difficult and a compromise might be the only practicable solution. The President, in consultation with her advisers, was authorized "to seek on the Society's behalf the best and most liberal solution attainable" using the 16/12/1974 Guidelines as a basis for negotiation with CAMD, with due consideration given to amendment of the 12th Schedule (a possibility opened up by the Minister's reply to ESQ); any agreed conditions to be reviewed after 2 years' service; and if negotiations were unsuccessful, the Society would be free to seek repeal. The ensuing Council Meeting set out fundamental principles of freedom of scientific research and teaching which AES wishes to see recognized, and which are not fully met by the 16/12/74 Guidelines. (For details see President's message in AES February News Bulletin, and the accompanying AGM minutes). Dr. Marks wrote to the Chairman, CAMD, on 4th February opening formal negotiations between AES and CAMD, and discussions are proceeding. Several interested bodies have been informed of the action AES is taking. Dr. Marks pointed out that any member of ESQ is very welcome to discuss this matter with her.

3. Consideration of Annual Report and Financial Statement. It was moved by Mr. Cantrell, seconded Mr. Sabine that the Annual Report and Financial Statement, as circulated in News Bulletin Vol 3, No. 1 of February, 1975, be taken as read. CARRIED. There being no amendments or queries regarding the Annual Report it was moved Mr. Wylie, seconded Dr. Woodward that it be adopted. CARRIED. There being no amendments or queries regarding the Financial Statement it was moved Mr. Storey, seconded Dr. Marks that it be adopted. CARRIED.

4. Election of Officers for 1975. There being no excess nominations for any of the Society's Officers it was moved Mr. McRae, seconded Mr. Standfast, that the nominations be received and those concerned be considered elected. CARRIED. Office bearers for 1975 are:

President	Mr. T. Passlow
Senior Vice-President	Mr. R.A. Yule
Junior Vice-President	Mr. G.B. Monteith
Honorary Secretary	Mr. B.K. Cantrell
Honorary Treasurer	Mr. R. Wylie
Councillors	Dr. B. Doube, Mr. G.P. Donnelly, Mr. B.H. Kay
Convenor Publication Committee	Dr. A.H.A. Bensink
Members Publication Committee	Mr. I. Naumann, Mr. G.B. Monteith

5. Induction of New President. Mr. Monteith expressed thanks to members of the outgoing Council for their support during his presidential year and then handed the meeting over to the new President, Mr. Tom Passlow. Mr. Passlow congratulated Mr. Monteith on his work as President and, as his first duty, invited him to give the 1975 Presidential Address.

6. Presidential Address for the year 1975

"RAINFOREST ENTOMOLOGY - AT HOME AND ABROAD"

By G. B. Monteith, Entomology Department,
University of Queensland.

Biological Duality.

The outstanding feature of the Australian rainforest insect fauna is the remarkable contrast between it and that of the open eucalypt forests which dominate the Australian landscape. The many islands of rainforest stretching along our eastern seaboard each represent a discreet enclave of insect species totally different from those of the sea of open forest in which the rainforest islands occur. Indeed, the environmental barrier which occurs at the interface between rainforest and open forest is a more potent barrier to faunal interchange than any mountain range or valley.

There are several reasons for this extraordinary duality in the Australian insect fauna. Firstly the zoogeographic origins of these two faunal elements are largely different, so to a large extent the taxonomic composition of the two faunas is different. The open forest fauna is chiefly the old endemic element which has had a long evolutionary involvement with the typical arid Australian environment. On the other hand the temperate rainforests of the south have many elements dating from the moist forests which covered much of Gondwanaland before the southern continents split asunder. The tropical and sub-tropical rainforests derive their insects largely from the Indo-Malayan region via New Guinea. These southern and northern rainforest faunal elements overlap broadly in the rainforests of northern New South Wales and southern Queensland.

These open forest and rainforest faunas have existed in juxtaposition for a considerable period of geological time and one would expect some degree of interchange to have taken place. In fact there seems to have been little, and this is especially so in the northern half where the faunal duality is most pronounced. This is reinforced by the fact that the species of plants in the two environments are also quite different, and for plant feeding insects this presents an insurmountable problem if they are at all host-specific, as most insects are. This is of special significance in Australia where, unlike other continents, the rainforest plants usually belong to quite different groups of genera to those of the open forests. For instance, the great proliferation of eucalypts in Australia has been accompanied by the development of a large and characteristic insect fauna associated with them. These include chrysomelid leaf beetles, including the genus Paropsis with hundreds of species, which can tolerate the eucalyptus oils repugnant to most insects. The jewel beetle genus Stigmodera, also with multitudinous species, has adults which feed from eucalypt and related myrtaceous flowers while their larvae breed in the wood. There is even a whole subfamily of native bees, the Euryglossinae, with short broad tongues adapted to the cup-like flowers of eucalypts. This whole complex of perhaps thousands of insect species is absent from rainforests which normally have no eucalypts.

Generally speaking, the Australian rainforest fauna is rich, but small compared with that of the full- fledged equatorial forests of Africa, South America and the Malay Archipelago. Figures for direct comparison are difficult to come by. Factors contributing to this comparative faunal depauperation are the distance from the equatorial zone and the relatively small size and insularity of the rainforest tracts in Australia. There have been marked fluctuations in the size and distribution of rainforest tracts in Australia in geological times and N. E. Marks (1) has recently produced a chronologue of these events. More recent data from pollen studies in crater lakes on the Atherton Tableland indicate that even in that apparently luxuriant region rainforest has come and gone several times in the last 60,000 years (2). Undoubtedly these recessions have led to local extinctions of many tracts of rainforest and their associated fauna. This resembles the situation postulated by Jago (3) with reference to grasshoppers in African rainforests. He says:

> "Hence as far as grasshoppers are concerned the tropical forest is a 'species sink', continuously seducing species into its confines and then eliminating them by fading away during dry interpluvial periods."

Such a 'species sink' effect could easily have worked in the same way with Australia's fluctuating rainforests.

Butterfly Faunal Composition

The butterflies are a group large enough, with 367 Australian species, and well known enough, to attempt an analysis of the relative importance of the rainforest and open forest components of the whole fauna. Last year I presented to this Society (4) a breakdown of the north-south distribution of the 324 species which occur along the eastern seaboard of the Australian continent, including Tasmania. This was done by comparing the size and composition of the faunas of twelve defined "distribution centres" ranging from Cape York to Tasmania and by calculating a value for the effectiveness of the barrier between each adjacent pair of distribution centres. Some of the notable points to be made from that analysis were the size of the fauna at Cairns and Brisbane, the marked diminution in number of species south of the Queensland border, and the potency of the faunal discontinuity between Cooktown and northern Cape York Peninsula.

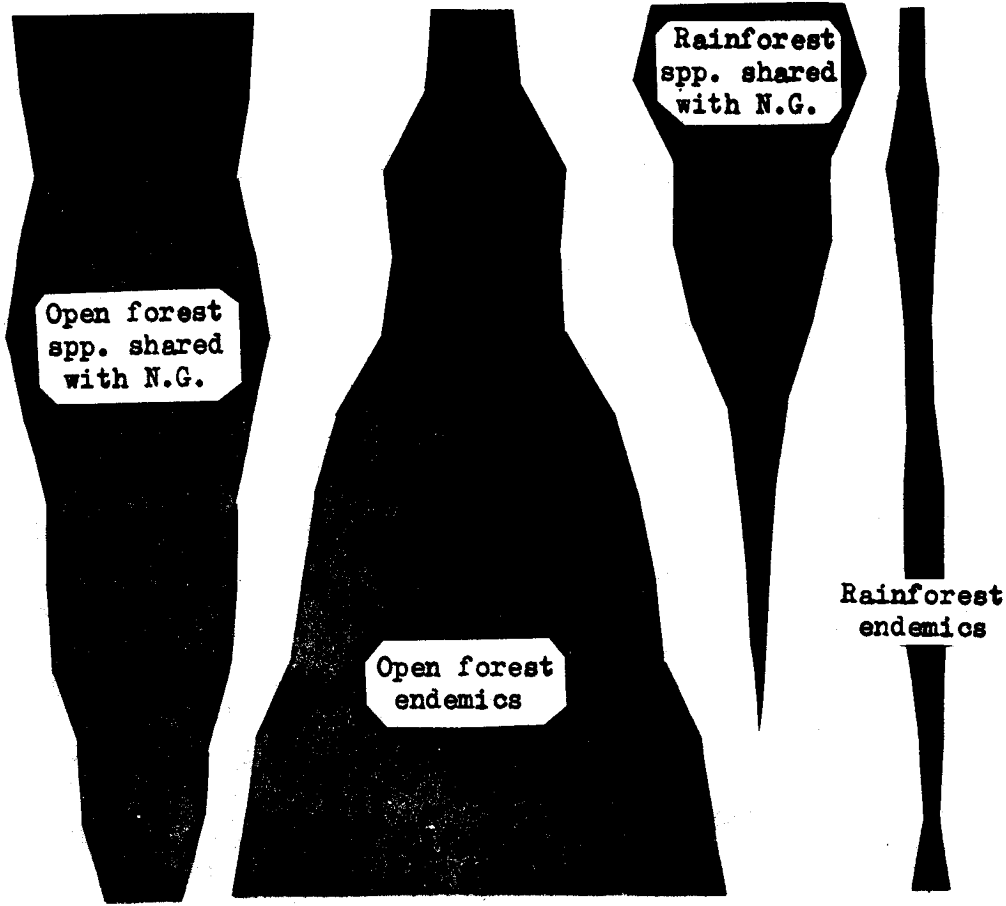
Taking the same set of distribution centres and segregating their butterfly faunas into those species whose distribution is dependent on rainforest and those (called open forest species on the Figure) for which rainforest is not essential, and then further segregating those two categories into species confined to Australia and species shared with New Guinea we find a pattern as shown in Figure 1. The relative widths of the histograms represent the percentage of the species in each distribution centre which fall into each category. Note that many of the "open forest" species do occur in rainforest but they are not confined to it. The few species which, on available information, could not be assigned to a category have been excluded from the percentage estimations.

Looking at the two components of the open forest fauna we see a fairly predictable pattern; the open forest species shared with New Guinea decline slowly with increasing latitude (i.e. with increasing distance from New Guinea); the open forest endemics, in contrast, rapidly become the dominant faunal component in the south, and in Tasmania and Victoria this component represents 80% or more of the total site faunas. The open forest endemics are inflated in the south by the large fauna of semi-alpine satyrids and trapezitine skippers which are characteristic of the cooler uplands of S. E. Australia.

FIGURE 1: Relative size of four components of the butterfly faunas of a latitudinal series of distribution centres in Eastern Australia.

DISTRIBUTION CENTRES

1	Cape York and near islands
2	Iron Range to Coen
3	Cooktown to Ingham
4	Townsville, Mt Spec
5	Mackay, Eungella
6	Rockhampton, Exped. Rge.
7	Gympie, Bris. Macpherson
8	Ebor, Barrington Tops, coast
9	Sydney, Illawarra
10	A.C.T., Alps, East Vic.
11	Central and Sth. Vic.
12	Tasmania



With the rainforest restricted species a very different pattern is seen. Those shared with New Guinea reach a peak at Iron Range where 66 spp. or 37% of the site total fall into this category. There is then a sharp decline in their numbers at Cairns illustrating once again the faunal hiatus between the Cairns rainforests and those further north in the Peninsula. South of Cairns this component diminishes rapidly until at Brisbane it constitutes only 6% (12 spp.) of the fauna there; no New Guinea rainforest species extend beyond Sydney. This pattern of distribution may be expected because it parallels, in an exaggerated way, the diminishing extent of rainforest itself in the south. However, the rainforest endemic component does not follow this pattern, nor does it in any way resemble that of the open forest endemics. Instead, the rainforest endemics represent a peculiarly uniform proportion of the fauna all the way from Cape York to Tasmania. Among them are numbered such species as the Regent Skipper, the Macleay Swallowtail and the Four-bar Swordtail which have ancient phylogenetic and distributional affiliations, and whose presence in Australia probably antedates Australia's juxtaposition with New Guinea. The two rainforest endemics occurring in Tasmania, the Macleay Swallowtail and the Leprea Brown (Nesoxenica leprea) are among the very few Australian butterflies to have successfully colonized temperate Nothofagus rainforests, a vegetational type with ancient antarctic affiliations.

But one of the problems of zoogeography is that present day patterns depend greatly on the centre of evolutionary origin, the age, and the dispersal powers of the particular taxonomic group under examination. Couple these variables with moving continents, fluctuating sea levels, changing climates, geological time and there is no wonder that no two zoogeographers ever agree ! Nor should we expect them to, because every group has had its own individually tailored history.

The butterflies are a fairly recent and highly vagile group which apparently evolved largely after the dissection and shrinking of the great temperate forests of Gondwanaland. Consequently most of Australia's rainforest butterflies derive from a recent injection of Indo-Malayan form from the north, via New Guinea or Timor. The Australian rainforest ants might very well show a similar pattern to that of Figure 1. If, on the other hand, we were to analyse the aradid bugs or the pterostichine carabid beetles in the same way we would find quite a different picture, for these are groups of lower vagility and older, more southern affinities. Both groups have large, diverse faunas of rainforest endemics, the carabids peaking in Centres 7 and 8, and the aradids peaking in Centres 3 and 7; both have very few rainforest endemics in Cape York Peninsula where they have a very weak component of New Guinea rainforest species which peters out about Cairns. If we were to similarlydissect the acridoid grasshoppers we would find merely a tiny wedge of New Guinea rainforest taxa extending into Cape York Peninsula and a virtual lack of endemic supra-specific rainforest taxa in Australia.

Ecological Studies

Australia is lagging sorrily behind the rest of the world in ecological studies. At a time when throughout the developing nations the competing demands put on the rainforest resource by timber harvesting, burgeoning tropical agriculture and conservation needs are generating a wealth of fundamental and applied studies of rainforest insect ecology, Australia can boast not one comprehensive project. This neglect has not been because of lack of general rainforest studies in Australia, for right here in Brisbane exists an active team of rainforest ecologists which is leading the world in classifying and interpreting the rainforest ecosystem. Within CSIRO, the combined talents of Len Webb as entrepreneur and theoretician, Geoff Tracey as taxonomist and field botanist extraordinaire, and Bill Williams as mathematician and sage, have produced a structural classification of Australian rainforests unparallelled in its elegance of predictability and utility. Working closely with Webb and associates is ornithologist Jiro Kikkawa, from the University of

Queensland, who is making pioneer contributions (5) to an understanding of the way vertebrates fit into the seasonal and spatial framework of tropical forests, both here and overseas. The indefatigable Californian, Professor Joe Connell, makes regular visits to Queensland to monitor his rainforest study sites in connection with a long term comparison of productivity of rainforests and coral reefs. All these workers need insect data to supplement their studies; they offer, in return, an incomparable body of basic information on the rainforest ecosystem in Australia. As yet no Australian entomologist has taken up their challenge.

However, many overseas ecologists of entomological bent have grappled with similar problems. Two prominent investigators have been Charles Elton, working in Brazil and Panama, and Daniel Janzen, working in Costa Rica and Puerto Rico.

It is interesting to compare the differences in approach of Elton and Janzen which perhaps reflect their national identities. Elton is the traditional Oxford Englishman, one of the fathers of modern ecology with 40 years experience of the near legendary Wytham Wood near Oxford; he had his first real experience of the tropical forest as recently as 1965, on a study visit to South America. Expecting a seething insect population he was amazed at the apparent dearth of insects inside the rainforest, and he spent two subsequent trips with his wife trying to demonstrate whether this was an illusion or not. He describes walking slowly through the vegetation, beating the foliage and brushing the tree trunks while continuously dictating observed ecological "events" to his attendant wife. Based on these observations of just a few hundred insects he showed that the apparent low density was indeed genuine but that diversity was extremely high. Elton proposes a theory of predator/prey interaction as the controlling factor (6).

Janzen, on the other hand, hails from University of Chicago (latterly at Ann Arbor, Michigan) and he comes over as the epitome of the brash, young American. Using almost solely the technique of random sweep-net sampling he plunges into the forest and carries out 2,000 sweeps before lunch. In an early study such collections at four different sites yielded more than 9,000 specimens for analysis (7). Later, he was to use that other North American characteristic of mobilizing student labour, and 60 students carried out some 30,000 sweeps at 39 different sites in Central America yielding more than 100,000 specimens which were sorted and tabulated (8). Unlike Elton, Janzen was able to draw upon a solid personal background of experience of the taxonomy and field behaviour of the Central American fauna in interpreting this mass of data which he analyses with respect to the season, the vegetation, the altitude, the insularity, and the time of day of the catches (9).

However, both Elton and Janzen suffered the same handicap in their studies: being based thousands of miles from their study areas; their field work was confined to fleeting visits. Each tried to compensate in different ways; Elton by recording detailed information on every specimen, Janzen by taking enormous samples. But both were hindered. This highlights a common flaw in tropical studies - the lack of opportunity for the investigator to have prolonged and regular contact with his target ecosystem - and this inevitably leads to shaky extrapolations from patchy data. The problem is being overcome these days by the establishment of on-site tropical research centres, such as the Wau Ecology Institute in New Guinea, where scientists can carry out long term studies with adequate facilities. A recent product of the latter institution has been the detailed study at Wau (10) of spider populations in relation to an annual cycle of climatic conditions. Needless to say a tropical biologist based at the University of Queensland would be a mere half hour drive from the rainforests of Mount Glorious; based at James Cook University he would be within hours of an extensive altitudinal gradient of tropical forests around Cairns.

Diversity

One of the outstanding problems of ecologists interested in natural ecosystems is that of the concept of diversity, how to define it and how to measure it in a comparative way. The arguments have largely become the province of mathematicians and diversity has even been recently relegated to the status of a "non-concept" (11). But no matter how much the mathematicians may wrangle it is axiomatic that diversity exists and varies. A coral reef undeniably has a more diverse fauna than a mud flat - it has more species and they are distributed more randomly. Since the days of Bates, Darwin and Wallace tropical biologists have been staggered at the diversity of plant and animal species cohabiting in a tropical rainforest. In Sarawak 9 hectares of forest yielded 550 species of trees greater than 6 inches in diameter (12); one square kilometer of the same forest contained more than 200 species of ants (13); a random sweep sample of 806 insects in Costa Rica consisted of 321 species of which 60% were represented by only one specimen (9); Bates collected 700 species of butterflies within walking distance of his home in the Amazon (6). This tropical diversity has two components; firstly there is a large number of species - and secondly the individual species occur at low densities. This is most pronounced in rainforest trees, and Alfred Wallace, writing of the Malayan forest in 1878, describes his impression in this way (14):

> "If the traveller notices a particular species and wishes to find more like it, he may often turn his eyes in vain in every direction. Time after time he goes towards a tree which looks like the one he seeks, but a closer examination proves it to be distinct. He may at length meet with a second specimen half a mile off, or may fail altogether, till on another occasion he stumbles on one by accidnet."

Wallace's impression has been experimentally supported by modern work and today there is abundant statistical proof that rainforest trees, unlike temperate species, tend not to grow near to other members of their own species. (15).

Why should such tropical diversity occur and what maintains it? This question has intrigued ecologists and evolutionists for a hundred years. We as entomologists should perhaps be flattered by the rather exciting notion, recently proposed independently by Daniel Hanzen (16) and Joe Connell (15), that insects may be behind it all. Put simply, their idea is that beneath a particular rainforest tree there builds up a population of insects specialized to feed on its seed. Thus all seeds which fall near the parent tree are immediately destroyed; those seeds that are dispersed far from the parent tree fall outside the zone of influence of these seed-feeding insects and have a better chance of growing. This gives a simple mechanism for inhibiting establishment of new trees near to old trees of the same species. The idea depends on the assumption of new trees near to old trees of the same species. The idea depends on the assumption that the seed-feeding insects ('seed predators" as Janzen whimsically calls them) will attack seed of only one tree species. Janzen has some hard data supporting this, and of 71 species of seed weevils he studied in Costa Rica fully 66 attacked only one seed species. This contrasts with the more catholic tastes of temperate forest weevils.

Light Breaks

I would like to suggest an unexploited area for study of the effects of insects on competition between rainforest tree species. There are two crucial periods in the early life of a rainforest tree. The first is germination of the seed and establishment of the seedling - this is the phase studied by Janzen and Connell. But seedling establishment is only part of the battle for the tree - because without light those seedlings will never grow appreciably. Thus we have in rainforest the phenomenon of so-called "suppressed seedlings" which may be several feet high and half an inch thick, but which are perhaps 10 to 20 years old. These remain in a state of virtual suspended animation unless they gain access to sunlight. The only way that this may happen is by rupture of the forest canopy, usually by windfall or lightning strike of an existing canopy tree. As soon as the new column of sunlight thus formed reaches the forest floor every suppressed seedling receiving light commences vigorous growth (Fig . 2). This is the second crucial competitive period in the life of a rainforest tree, for the seedling which grows fastest and reached the canopy first seals off the light aperture and all its unsuccessful competitiors cease growth for lack of light and revert to the status of suppressed seedlings once more.

Now every good collector knows that the best place to find phytophagous insects in a rainforest is at a light break, where the flush of new growth of the suppressed seedlings generates intense insect activity. Could not the selective pressure of insect attack on competing seedlings at this stage determine which one makes it to the canopy and becomes a mature tree?

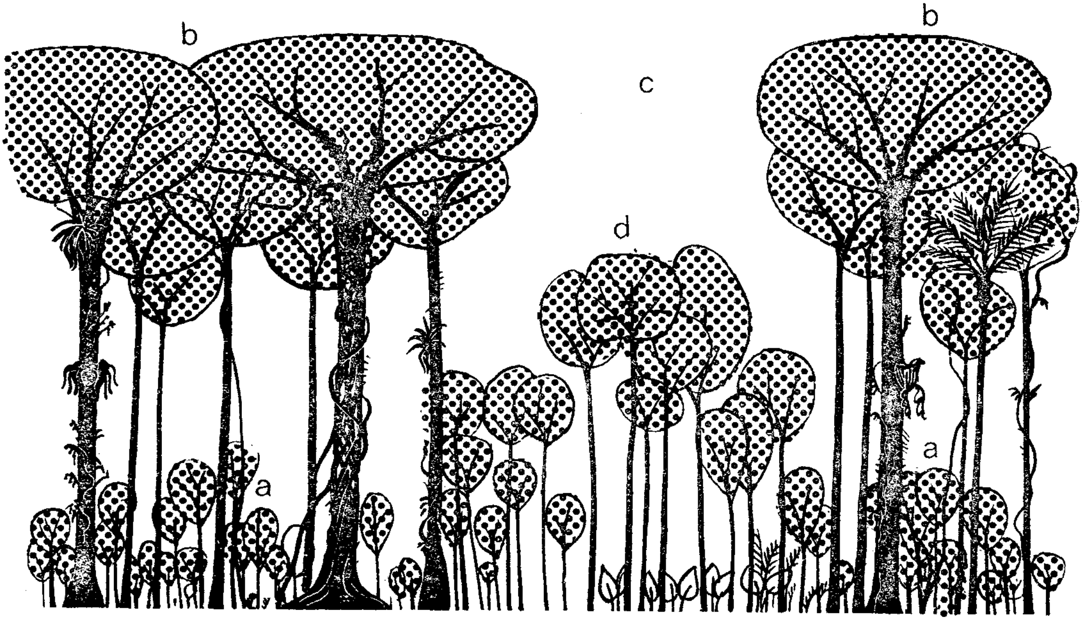


FIGURE 2: Profile diagram of an idealized rainforest showing suppressed seedlings (a) beneath the closed canopy (b) Beneath a light break (c) released seedlings (d) compete vigorously in a growth race for the space in the canopy.

The Janzen-Connell theory of selective seed predation as a diversity maintenance mechanism depends on a high population of host-specific seed predators building up under a parent tree and destroying all nearby seeds. Since insects which attack mature trees do not attack seeds, the parent tree, itself, would not yield insects to attack its own seed. However, insects which attack mature trees do attack young trees, so in a light break situation a nearby parent would act as an immediate source of its suite of host-specific leaf, shoot and stem-attacking insects to inhibit the growth of its suppressed seedlings which are competing in the race for the canopy. This gives a biological mechanism which is directly linked to the presence of the parent tree for explaining, at least in part, why rainforest tree species do not tend to grow near each other.

The Australian scene poses a number of questions about these theories of diversity maintenance. For example, if the host-specific 'predator' theory is correct and increasing host-specificity of insects in the tropics generates tree diversity, then why in Australia do we find juxtaposed at the same place in time and space non-diverse eucalypt forests and diverse rainforests? Does latitudinally generated host-specificity only occur in rainforest? Or could it be that in open eucalypt forest competition for light is reduced and therefore seedling competition in light breaks does not occur as a diversity induction mechanism?

I believe that study of the entomology of light breaks could be an extremely rewarding avenue in the search for an explanation for tropical diversity. However I see a problem of logistics looming - now seed production is a regular event in a rainforest and any peripatetic ecologist turning up in the tropics on a two week field trip can be assured of finding some seeds to count - and germination (or lack of it) is a fairly rapid process. But light-breaks are rare events and may happen at a particular spot only once in 20 years - and subsequent seedling growth may take months or years. This low frequency of occurrence may be quite sufficient to generate a pattern in the forest ecosystem - but it is a damnably low frequency to fit into a tight research programme!

Light breaks come into the category of infrequent catastrophic events which will never be properly studied. But tropical biologists must not ignore catastrophes, for storms, cyclones, floods and earthquakes are common events in evolutionary time. For instance, I believe catastrophic events are underplayed in dispersal considerations. Too many armchair zoogeographers visualize small insects being wafted into the air on thermal currents - or a floating log being gently left by the tide on a foreign strand. Whereas they should think in terms of giant floods which gouge out a half acre of rainforest and carry it to sea - or cyclones, like Tracy, which blast trees a mile into the sky - or mass extinctions, such as on Krakatoa, where every plant and animal was wiped out overnight.

Ants

Ants are one of the dominant life forms in tropical rainforests; they make up for their small size by their prodigious numbers and colonial behaviour. In particular ants are lowland insects and throughout the world biologists have found marked diminution of the ant fauna with altitude and few occur in rainforest above 2,000 metres. Lowland faunas can be immense and Taylor reports more than 200 species in a square kilometre of forest in Borneo and 172 species at Lae in New Guinea (13). This intense ant pressure may modify the whole insect fauna of an area, and Darlington attributes the virtual absence of flightless ground carabid beetles in New Guinea lowlands to their failure to compete with ants (17). He also notes a marked bimodal distribution in the size range of lowland carabids which he explains by the hypothesis that the small carabids can hide from ants and the very large ones can fend them off - the medium sized ones are eliminated.

Our Australian rainforest ant fauna has been well-collected but is as yet poorly known in print. Taylor has shown that our richest site fauna, with 106 species, is not, as we might guess, in the luxuriant and diverse Cairns-Atherton region but at the relatively depauperate and isolated Iron Range rainforest tract in Cape York Peninsula.

However Iron Range is our most extensive lowland rainforest site so it appears that the world trend is followed in Australia. Furthermore, 57% of the Iron Range fauna is composed of New Guinea species, reinforcing the known New Guinea influence in this region. The flightless carabid fauna of these Cape York forests is also greatly reduced and this lends support to Darlington's theory that ants are an inhibiting influence. One exception is the giant carabid, Mecynognathus daemeli, confined to the forests at the tip of the Peninsula. Perhaps its great size was generated as a defence against ants!

Certain species of tropical ants, especially arboreal ones, stand out as being exceptionally dominant organisms. Examples of these are the army ants, the leaf cutter ants, the green tree ants and those of the ant/acacia complex. Elton (18) has described these as forming what he called "monopolistic communities" which are so antagonistic that they exclude all other animals within their influence. Latterly Dennis Leston has proposed a novel theory of what he called the "ant mosaic" which he regards as a basic property of tropical forests (19). Working in Ghana Leston recognized about 15 dominant species of ants which occupied a changing three dimensional mosaic in theforest and he believed the nature of the whole arthropod fauna at any particular site was dependent on the composition of the ant mosaic existing at that time.

Some of these dominant ants may be deleterious to man, such as the leaf-cutters in tropical America where one nest may harvest up to 21,000 leaf fragments per day from orchard crops (20), others may be beneficial to man, such as the tree ants of the genus Oecophylla whose presence prevents phytophagous insects from establishing on a tree. An exciting recent development in tropical agriculture has been attempts to modify the influence of such ants and few new branches of applied entomology could claim, as Peter Room did at the International Congress, that 'more successes than failures have been reported in the literature of attempts at manipulation of ants for pest control in tropical tree crops' (21). In Ghana, ants depress the effects of cocoa-capsids on cocoa (22); in the Solomon Islands chemical control of Pheidole ants, which were preventing green tree ants from establishing in coconut trees, enabled the green tree ants to inhibit nut-fall bugs again (23); in New Guinea the arrival of an accidentally introduced dominant ant controlled several pests of cocoa (24). In North Queensland one such beneficial ant is the green tree ant, Oecophylla smaragdina, commonly found in orchards grown near rainforest. Needless to say its population ecology there has never been studied.

Tropical Agriculture

There are many lessons, other than those of the ant, to be learnt by the tropical agriculturist from rainforest ecology studies. One of these is an appreciation of the effects of seasonality on tropical insect populations. Our familiar seasons of spring, summer, autumn and winter were originally based on temperate-climate agricultural events in Europe, and were later defined by largely temperature data. Such seasons clearly have little relevance to tropical climes with little temperature variation. In the tropics the usual tendency has been to recognize "wet" and "dry" seasons, but this is an over-simplification. In a recent intensive study of insect populations in Ghana, Gibbs and Leston (25) found that to adequately interpret their insect activity data they needed to define six seasons using a combination of rainfall and sunlight data. Their seasons are shown in Fig. 3. Davis (26), working in Brazil, also needed a six-season year to explain his mosquito data, though his seasons were different from those of Gibbs and Leston. Fogden, working in Sarawak, showed that the very slight dry season there in a year of otherwise virtually continuous rain was, nevertheless, sufficient to produce a slight variation in insect numbers which in turn triggered breeding in the bird populations (12). Robinson et al. (10), working in New Guinea, observed two peaks of spider populations coinciding with the two slight dry spells which occur at Wau.

Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov

1. DRY SUNNY	2. FIRST WET SUNNY	3. FIRST WET DULL	4. DRY DULL	5. SECOND WET DULL	6. 2ND WET SUNNY
Fruit and Seed Feeders	Foliage Feeders	Timber Borers			Foliage Feeders

FIGURE 3: The six "seasons" of a tropical rainforest in Ghana, West Africa, showing some peaks of insect activity. (adapted from Gibbs & Leston, 1970)

So we can see that tropical pest entomologists need to appraise closely the seasonal idiosyncracies of their surroundings, especially when working with tree crops such as coffee and cocoa which are often grown in association with natural rainforest. But this is not always the case, for as Janzen has said (16):

> "Agricultural experiment stations in the tropics are woefully understaffed, ill-equipped and out of date. Their personnel are generally not keen pursuers and exploiters of the special features of the tropical agricultural ecosystem. This is not surprising when we realize that their staff are generally products of the educational system of some developed country, with guiding philosophies oriented towards agricultural ecosystems evolved to deal with the annual pulse of energy provided by the temperate zone summer."

We have many young entomologists who come to Australia from tropical countries for post-graduate training in agricultural entomology. Given the remarkably different patterns of insect activity in tropical and temperate vegetations, we might very well ask what is the best sort of research project to equip them for their future career: an applied project on a temperate crop, such as cabbages - or a non-applied project in tropical vegetation, such as at Mount Glorious or Cairns.

In closing, I would like to express the firm conviction that no biologist should feel his education complete until he has experienced the tropics, where animals and plants reach their zenith, and the insects step to the beat of a "different drummer". I firmly believe that University practical courses in ecology must provide more than cabbage patches, Tribolium cultures and computer simulations. Let's face it, most of our applied graduates will probably spend their professional lives in cabbage patches, so why not give them a taste of the Garden of Eden, and let them hear that "different drummer", before their options close.

REFERENCES

1. Marks, E.N. (1972) Mosquitoes (Culicidae) in The Changing Australian Environment. Qd. Nat. 20 (4-6): 101-116.

2. Kershaw, P. (1973) Quarternary History of Rainforests in Australia. Wildlife in Australia 10 (2): 82-83.

3. Jago, N.D. (1973) The Genesis and Nature of Tropical Forest and Savannah Grasshopper Faunas, with special reference to Africa. In Meggers et al (Eds) Tropical Forest Ecosystems in Africa and South America - A Comparative Review.

4. Monteith, G.B. (1974) An Exercise in the Distribution of Eastern Australian Butterflies News. Bull. Ent. Soc. Qld. 2 (4): 57-59.

5. Kikkawa J. & Webb, L.J. (1967) Niche Occupation by Birds and the Structural classification of forest habitats in the wet tropics, North Queensland. XIV. IUFRO Congress (1967) pp. 467-482.

6. Elton, C.S. (1973) The Structure of Invertebrate populations inside neotropical rainforest. J. animal Ecol. 42: 55-104.

7. Janzen, D.H. & Schoener, T.W. (1968) Differences in Insect Abundance and Diversity between wetter and drier sites during a tropical dry season. Ecology 49 (1): 96-110.

8. Janzen, D.H. (1973) Sweep samples of tropical foliage insects: effects of seasons, vegetation types, elevation, time of day and insularity. Ecology 54 (3) 687-701.

9. Janzen D.H. (1973) Sweep samples of tropical foliage insects: description of study sites, with data on species abundances and size distributions. Ecology 54 (3): 659-686.

10. Robinson, M.H., Lubin, Y.D. & Robinson, B. (1974) Phenology, Natural History and Species Diversity of Web-building Spiders on three transects at Wau, New Guinea. Pacific Insects 16 (2-3): 117-163.

11. Hurlbert, S.H. (1971) The non-concept of species diversity: a critique and alternative parameters. Ecology 52: 577-86.

12. Fogden, M.P.L.(1972) The seasonality and population dynamics of equatorial forest birds in Sarawak Ibis 114: 307-43.

13. Taylor, R.W. (1972) Biogeography of insects of New Guinea and Cape York Peninsula. In Walker, D. (ed) "Bridge and Barrier: The Natural & Cultural History of Torres Strait" (ANU: Canberra).

14. Wallace, A.R. (1867) The Malay Archipelago. MacMillan, London.

15. J.H. Connell (1971) On the role of natural enemies in preventing competitive exclusion in some marine animals and in rainforest trees. Proc. Adv. Study Int. Dynamics Numbers Popul. (Oosterbeck, 1970): 298-312.

16. Janzen, D.H. (1974) "The role of the Seed Predator Guild in a Tropical Deciduous forest - with some reflections on tropical biological control" In D.P. Jones & M.E. Solomon (Eds) Biology in Pest Disease Control. Blackwell Scientific Publs, Oxford.

17. Darlington, P.J. (1971) The carabid Beetles of New Guinea. Part IV. General Considerations, Analysis and History of Fauna, Taxonomic Supplement. Bull. Mus. Comp. Zool (Harvard) 142 (2): 129-337.

18. Elton, C.S. (1966) The Pattern of Animal Communities. Methuen, London.

19. Leston, D. (1972) The Ant Mosaic: A Basic Property of the Tropical Forest Zone. Abstracts XIV Int. Congr. Ent., Canberra, 1972.

20. Lewis, T. (1972) Foraging habits of leaf cutting ants (Attinae:Formicidae) in Trinidadian citrus and cocoa fields. Abstracts XIV Int. Congr. Ent., Canberra, 1972.

21. Room, P. (1972) A Rational approach to control by ants of pest situations in tropical tree crops. Abstracts XIV Int. Congr. Ent., Canberra, 1972.

22. Collingwood, C.A. (1972) Ants in relation to damage in West African cocoa farms caused by the capsids Distantiella theobroma and Sahlbergella singularis. Abstracts, XIV, Int. Congr. Ent., Canberra, 1972.

23. Stapley, J.H. (1972) Field studies in the use of the Oecophylla Ant in the control of premature nutfall in coconuts in the Solomon Islands. Abstracts XIV, Int. Congr. Ent, . Canberra, 1972.

24. Baker, G. (1972) The role of Anoplolepis longipes Jerdon in the entomology of cacao in the northern district of Papua New Guinea. Abstracts XIV Int. Congr. Ent., Canberra, 1972.

25. Gibbs, D.G. & Leston, D. (1970) Insect phenology in a forest cocoa-farm locality in West Afric a. J. appl. Ecol. 7: 519-548.

26. Davis, D.E. (1945) The annual cycle of plants, mosquitoes, birds and mammals in two Brazilian forests. Ecol. Monogr. 15: 243-295.

VOTE OF THANKS: Mr Yule proposed a vote of thanks to Mr. Monteith for his provocative and challenging address. This was carried by members applause.

There being no further business the President closed the meeting and invited members to supper.

REQUEST FOR CONTRIBUTIONS TO THE DIRECTORY OF RESEARCH IN NORTH AUSTRALIA

The North Australia Research Unit, established by the Australian National University in 1973, is seeking contributions to the first issue of its Directory of Research in North Australia. The unit believes that if those working or interested in work being undertaken in the North were more fully aware of what is being done in their own and in other fields and the opportunities which exist, research would be stimulated to the advantage of the country as a whole.

Details concerning the Directory are given below. Society members and others wishing to contribute should send information to Dr. F.H. Bauer, Field Director, North Australia Research Unit, Box 3121, P.O. Darwin. N.T. 5794, by 31st March, 1975. Publication in June or July is anticipated.

Details of the Directory:

1. No major editorial control will be exercised, but contributors should report only on bona fide projects which have or are expected to result in publication in books, monographs or reputable journals.
2. A format sheet showing a sample contribution is reproduced below and contributors are asked to follow the format closely. Entries in the Directory will be organised according to discipline and type of research and contributors are asked to indicate the major subject under which their work falls (e.g. Agriculture) and one or more subheadings which would help classify it more presicely (e.g. pasture improvement). Specific locations in which research is being carried out are also requested.
3. Contributors are requested to report all projects under way, but each on a separate sheet.
4. Where possible resumes should be kept to 2 - 300 words.
5. For the purposes of the publication North Australia is considered as those parts of Western Australia north of the Tropic, all of the Northern Territory, and Queensland north of a line connecting Birdsville and Townsville. Contribution covering research anywhere in this broad region, or having application direct or potential, to it are requested.

SAMPLE OF FORMAT

O.H. Browning.

Field and Library investigations have shown that contrary to popular opinion, the most influential factor in guiding settlement . . . . .etc.

Location of Research: Barkly Tableland, N.T.

Publication:

O.H. Browning (1972). Factors influencing the settlement of the Eastern Barkly Tableland. Northern Hist. J., 61, 21-33.

NEW PRINTING OF THE CAPE YORK REPORT

Sales of the Fauna Subcommittee's first report on a conservation area have been so brisk that a new printing has become necessary. This report is entitled "Focus on Cape York" and concerns the entomology and biological history of the region surrounding Cape York, Somerset and the Lockerbie rainforests at the northern tip of continental Australia. The report, which runs to 36 pages with two pages of illustrations and a fold-out map, is being sold for $1 25 plus 25 cents postage if applicable. If you wish to obtain a copy please write to the Honorary Secretary whose address appears on the rear cover and enclose the necessary amount.

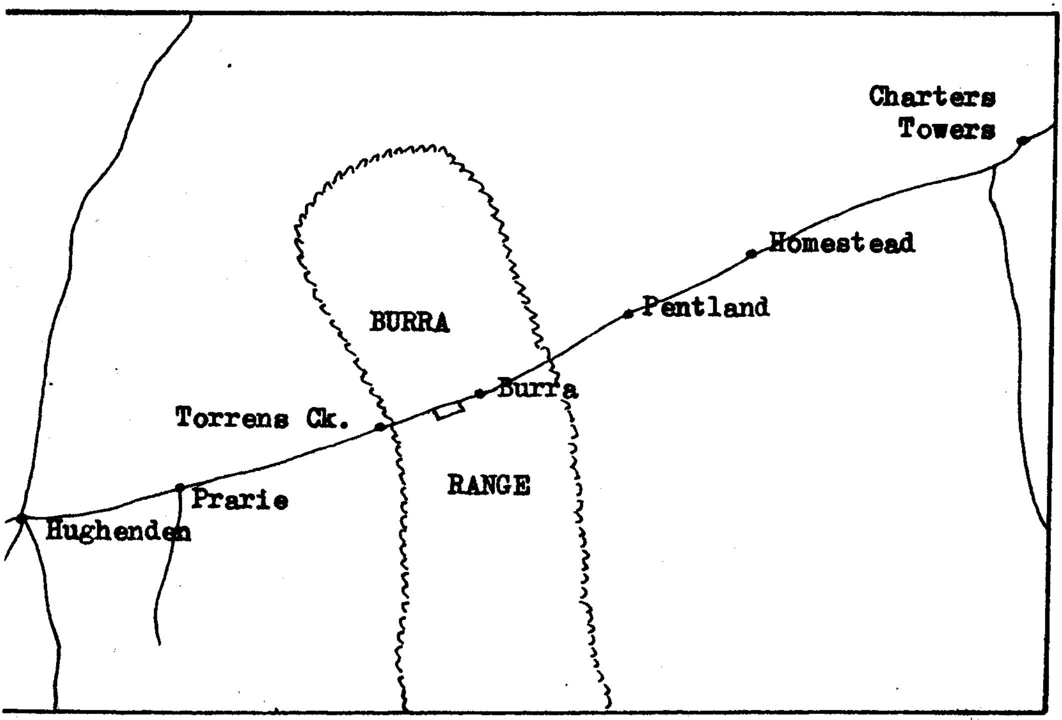
NOTES ON A VISIT TO THE BURRA RANGE

Having regard to our President's remarks (News Bull. E. S. Q. 2(4):59) concerning 'southern collectors who pass flat out through Brisbane each year with nets protruding from windows and "Cairns or Bust" scrawled on their rear windows' one feels diffident about commenting on northern collecting trips. Nevertheless four of us, Ray and Nola Manskie of the Entomological Society of Victoria, Mary and I, took the road to Central Queensland on 30th September last, assiduously avoiding the hazards of trying to negotiate the maze of Brisbane's geography by taking inland roads.

The objects of this visit were twofold. Firstly, we wanted to again see the Blackdown Tableland in the spring with Andrew Atkins, and secondly, to pay a visit to the Burra Range, west of Charters Towers.

Over the lunch table at the Queensland University Entomology Department in June, 1973, we had been told of the special excursion by members of the Society for Growing Australian Plants to Burra to see its most interesting flora. Naturally the thought of such an outstanding array of plants suggested there might be an equal variety of insects. We had tried to go to Burra the following spring, but with rains at that time, roads were closed and the visit postponed

After a week's stay at Blackdown Tableland, the Manskie's returned to Melbourne via Maryborough while Andrew joined us on the road to Burra. The road west from Charters Towers follows the railway line fairly closely and the Burra Range itself is crossed just west of Burra siding (see map). Here we found a sandstone range of some 300 metres elevation with much bare rock decomposing on some ridges and slopes to gravel in the valleys. From the parking area on the roadside at the crest of the range, the flora looked most interesting entomologically. There was ground cover of spinifex and small shrubs, intermediate flora including cassias, grevilleas and small acacia, with eucalypt and larger acacia providing the tree cover.



A tour of the valleys and ridges soon showed that, unlike the Expedition Range with its greater elevation, permanent water and cooler mountain climate, this area is completely dry at this time of the year and almost devoid of flowers. The only plant in flower was a tall leafless spike of creamy flowers attracting a very few butterflies and beetles.

Of the butterflies there were a few Euploea core corinna, one Pelopidas lyelli, two worn Lampides boeticus, one Delias argenthona, hardly an exciting array. However, on a hilltop near the parking area, Andrew managed to net four Ogyris iphis, greatly extending its range of distribution. There were a number of Hesperilla malindeva on the odd Ghania tussocks and several Trapezites larvae on Lomandra. I took two small buprestids on the flower spikes.

We are looking forward with anticipation to again paying a visit to this interesting looking Burra Range at a more suitable time of the year.

J. C. LeSouef
Godfrey St,
BLAIRGOWRIE. VIC. 3942.

REQUEST FOR DATA ON ENTOMOLOGISTS AND RELATED SPECIALISTS

Dr. Kent H. Wilson of Oklahoma, USA, is compiling data on entomologists and related specialists throughout the world. Full details of the project are given below and it is hoped that many members of this Society will complete the form included with this month's Bulletin and send it to Dr. Wilson at the address given. Please help.

Details of the Project: Data are being assembled on the entomologists of the world, past and present: authors, collectors, dealers, acarologists, and related specialists. Data on about ten thousand entomologists have already been accumulated. The list is now being updated by asking for data from living entomologists (including acarologists).

Gould published comparative data concerning botanists in 1965. The entomologists retrieval codes used in this project will follow the system developed by Sydney Gould and will be registered and combined with Gould's. An individual's code will thus be the same unique code in both systems.

Data will be made available for use in data retrieval systems. The purpose is to establish an author data bank for working with entomology and related fields (mathematics, biometry, color, etc.). Personal data on finances, marriage, political affiliation, opinions, use of products, and other data that are not relevant to entomology are not required or wanted. The sole purpose is to aid in the storage of entomological and other data. The results will made available in three forms: (1) published lists of names, dates, sources, interests, (2) data will be placed on the requestor's computer tape for possible use in his system, and (3) full data on an individual in the files will be made available upon request. It is hoped that, subsequently, additional data (list of publications, new taxa, etc) will also be stored on tape and made available for distribution and retrieval. No attempt has been made to be exclusive; the intent is to be inclusive. If you have published or contributed in any way in the field of entomology, it would be appreciated if you would fill out and return the enclosed questionnaire.

Kent H. Wilson,
P.O. Box 1097,
Edmond,
OKLAHOMA. U.S. 73034.

NOTE ON THE NEWS BULLETIN COVER PICTURE

The News Bulletin cover picture for 1975 honours the Society's President, Mr. T. Passlow, and the work of the Entomology Branch of the Dept. of Primary Industries on important agricultural pests in Queensland. Pests featured in the cover design, across the page from upper left to lower right, are:-
Plusia argentifera, Tribolium castaneum, Cydia pomonella, Nezara viridula nymph, Strymeta tryoni, Pieris rapae, Cosmopolites sordidus, Gascardia destructor, Heliothis armigera and Tetranychus urticae.

This month's cover story, on Tetranychus urticae Koch, the Two-Spotted Mite, is written by Ms. Leone Markwell who is currently working on the biology of the predacious mite Amblyseius longispinosus, with a view to its use as a biological control agent for the two-spotted mite.

IMPORTANT PESTS OF AGRICULTURAL CROPS IN QUEENSLAND. PART 2.
The Two-Spotted Mite

The Two-Spotted Mite or Red Spider Mite, Tetranychus urticae Koch is a pest of worldwide distribution on a wide range of host plants. In Queensland, it is a pest of apples, pears, plums, strawberries, beans and cucurbits, and an occasional pest of a number of other crops such as tomatoes, pawpaws and eggfruit.

The two-spotted mite causes damage by piercing the leaves with its stylet-like chelicerae and draining out the cellular material near the puncture. When the mite population is large, the leaves may be killed and drop off the plant.

Stages in the life cycle are egg, larva, protonymph, deutonymph, and adult. The active summer-form female is of a greenish coloration with black markings. However, in colder areas, the mite overwinters as the quiescent female and is orange in colour. The term, "spider mite", comes from the ability of the mite to spin a fine web over the leaves of the plant on which it feeds.

Two-spotted mite has become a major problem since the advent of chlorinated hydrocarbon insecticides. The use of these compounds upsets the delicate spider mite - predator complex, and has caused the mite to become a major pest in areas where it had been of no or secondary importance.

Since the two-spotted mite rapidly builds up resistance to the acaricides used for its control, biological means of control are desirable. There are two main predators - a coccinellid Stethorus spp. and mites of the family Phytoseiidae.

Interest in Queensland has centred on the phytoseiids because a number of species have been found to be resistant to organophosphate insecticides, and thus are promising control agents. The Dept. of Primary Industries has two projects underway at present in this area of study.

1. An organophosphate resistant strain of Typhlodromus occidentalis has been introduced from California to the Granite Belt as a possible two-spotted mite control measure in apple orchards.
2. Amblyseius longispinosus appears important in regulating two-spotted mite populations on a range of hosts in Queensland. Initial studies are being made on its biology and pesticide resistance in relation to strawberry production with a view to minimizing the use of acaricides.

L. Markwell
Entomology Lab.
Dept. of Primary Industries
Meiers Road,
Indooroopilly.

ABOUT PEOPLE

Ian Johnson, an entomologist with the Department of Primary Industries, has been transferred from the Indooroopilly Laboratory in Brisbane to Rockhampton where he took up duties on March 17.

Andrew Atkins has been transferred from Rockhampton to Melbourne in connection with his career with ABC television. During his several years stationed at Rockhampton Andrew made many exciting investigations into the distribution and biology of Central Queensland butterflies and was responsible for first making known the rich and interesting fauna of the little known Blackdown Tableland in the Expedition Ranges west of Rockhampton.

Henry and Ann Howden, from Carleton University, Ottawa, and interested in scarabs and weevils respectively, have continued their extensive collecting tour of Queensland together with daughter Lucy. After being based at Atherton for some time they returned down the coast with pauses at Ayr, Rockhampton and Peregian before arriving in Brisbane on March 12. They then spent 5 days at the University Field Station on Stradbroke Island, two hectic days of which they shared quarters with four classes of entomology students. All who saw Henry in action were impressed with his technique of digging geotrupines from burrows of prodigious depth.

Harry Wharton, of CSIRO Long Pocket Laboratories, has been invited to present papers at a haemoparasite workshop to be held at the Centro Internacional de Agricultura Tropicale in Cali, Colombia, South America. He will be absent from Brisbane from the 17th to 26th March.

Mr. Kuddythamby Ratnazingham, of the Agricultural Zoology Department of the University of Ceylon is visiting Australia on a Colombo Plan Fellowship and will be stationed at the CSIRO Long Pocket Laboratories until March 28 for training in tick culture. He will then spend a period at the University of Queensland.

Dr. Kleber A. Lorr, a medical entomologist with the Organizacion Pan Americana de la Salud, Guaquil, Ecuador, has arrived in Brisbane to begin a twelve month stay with the CSIRO Long Pocket Laboratories. Dr. Lorr is on a WHO Fellowship and will receive training in veterinary entomology.

Professor Bill Reeves, of the Department of Epidemiology, University of California (River side) visited Queensland for a period in February during which he was hosted by the Queensland Institute of Medical Research. His interests lie with arboviruses and the epidemiology of entomological problems and he was specially interested in current Australian research on Murray Valley Encephalitis. While in Queensland he visited the QIMR field station at Kowanyama on the Gulf of Carpentaria to see field studies on the problem in progress.

Professor Winfield Sterling, from the Texas A. & M. University, an expert on the control of cotton pests, has joined the Department of Entomology, Queensland University, for a year of study and research on cotton pest problems in Queensland. He will be working in close co-operation with the University's integrated Pest Management Unit.

Drs. Waterhouse, Wharton, Macqueen and Doube of CSIRO Division of Entomology, and Dr. Ed Loomis, from California, took part in a field day at "Craighoyle" field station, located on the National Cattle Breeding Station of "Belmont", at Rockhampton, on 28th February. The meeting organised by the Australian Society for Animal Production, discussed the results of CSIRO experiments on non-dipped cattle and very successfully demonstrated to graziers the positive advantages of not dipping. The benefits of CSIRO's dung beetle research programme were also discussed with a very favourable response from graziers present.

NOTICE OF NEXT MEETING

The next meeting of the Entomological Society of Queensland will be held at 8.00 p.m. on Monday, 14th April, 1975, in Room 323 of the Hartley Teakle Agriculture Building, University of Queensland, St. Lucia, Brisbane. The main business of the evening will be an address by Mr. Ian Cunningham, a Ph. D.candidate in the Department of Entomology, University of Queensland. His address will be entitled:

"Reduced Pesticide Use in Tobacco - How has it come about?"

Visitors are welcome and supper will be served after the meeting as usual.

THE SOCIETY

The Entomological Society of Queensland is an association of over 300 people with a professional or amateur interest in Entomology. It is dedicated to the furtherance of Pure and Applied Entomological Science and, since its inception in 1923, has promoted liaison amongst entomologists in academic, private and governmental institutions. It has a concern for the conservation of Queensland's natural resources. Further information is available from the Honorary Secretary at the address given above.

MEMBERSHIP

Membership is open to anyone interested in Entomology and entitles the member to attend monthly Society meetings, held on the second Monday night of the month, and to receipt of the News Bulletin. There are three classes of subscription membership:
Ordinary: persons residing in the Brisbane area ($9.00 p.a.)
Country: persons residing outside Brisbane ($8.00 p.a.)
Associate: persons not in receipt of a full salary ($3.00 p.a.)

THE NEWS BULLETIN

The monthly News Bulletin reports on the Society's monthly meeting, keeps members informed of Society events and news, and provides a vehicle for debate and discussion. Contributions in the form of articles, notes, letters, news clippings and photographs are always welcome, and should be sent to the Convenor of the Publication Committee at the address given above. The deadline for contributions is the Wednesday following the monthly Society meeting.