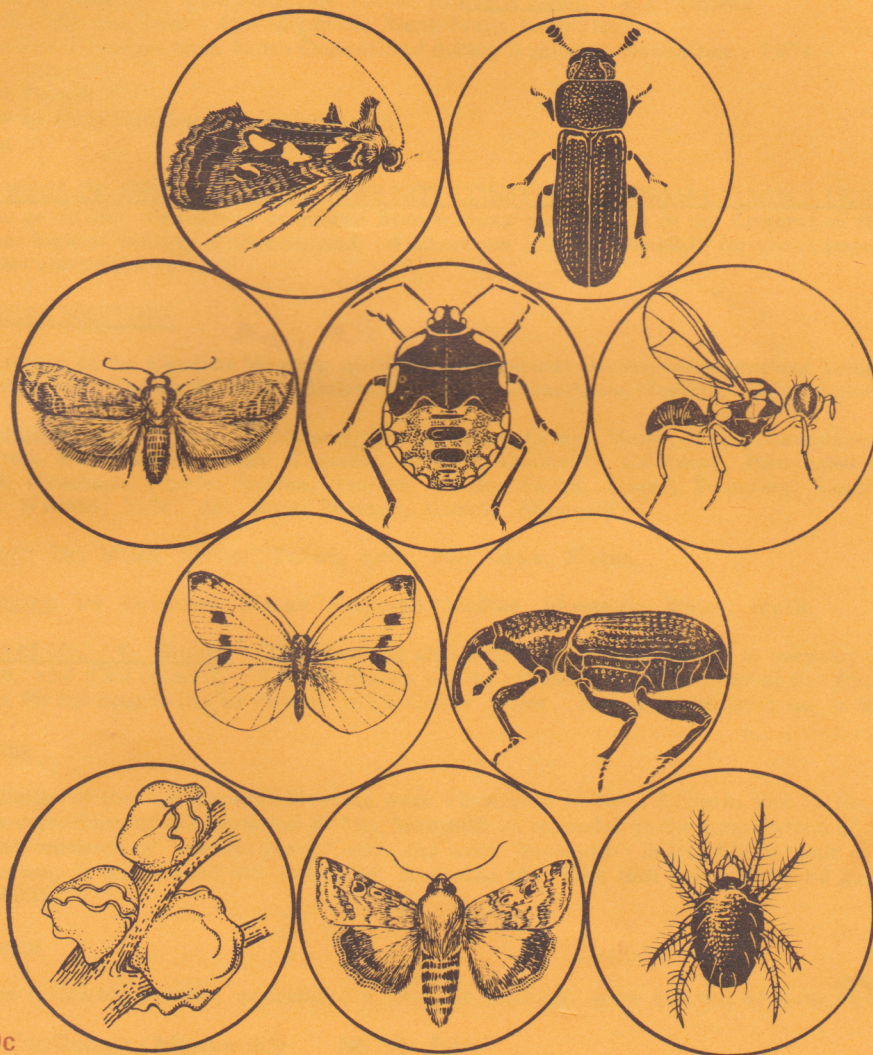


J. J. Kettle



NEWS BULLETIN

ENTOMOLOGICAL SOCIETY
OF QUEENSLAND



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GENERAL MEETING

Minutes of the General Meeting of the Entomological Society of Queensland held in Room 323 of the Hartley Teakle Building, University of Queensland, on Monday, 13th October, 1975.

Attendance: Mr. Passlow (President), Drs. Bensink, Exley, Marks, Reye, Saunders, Stone, Wharton, Woodward. Messrs. Cantrell, De Barr, Donnelly, Galloway, Hammond, Kay, Lake, Libke, Naumann, Postle, Sabine, Samson, Slater, Smith, Storey, Swindley, Teakle, Webb, Wild, Willson, Yule. Ms. Boys, Burrows, Holton, Monteith.

Visitors: Dr. Miles, Messrs. Tuhan, Kem, Ms. Libke, Slater.

Apologies: Dr. Bengston, Messrs. Ferguson, McRae, Monteith, White, Wylie.

Death of Mr. J. G. Brooks. The meeting observed a moment's silence in memory of Mr. J. G. Brooks, who died recently. George Brooks was an Honorary Life Member of the Society and well known for his hospitality to visitors at his Cairns home. His main interests lay in the Coleoptera.

Minutes

Minutes of the last General Meeting were circulated in News Bulletin Vol. 3 No. 7. Subject to the correction of the omission of Mr. Monteith as seconder to the nomination of Mr. A. Slater and the omission of "species group" after the word "mosquito" in Dr. Marks' part of the Discussion, it was moved Mr. Donnelly, seconded Mr. Yule that the minutes be accepted.
CARRIED.

Elections

The following persons, nominated at the last meeting, were elected by show of hands.

For Ordinary Membership	Mr. H. Lake
	Mr. A. Slater

General Business

1. The President brought to members' attention a symposium organised by the Linnean Society of N. S. W., to discuss the Insect Export Legislation to be held in Sydney on 29th November 1975. Dr. Marks has been invited to deliver the case against the Legislation.

2. Insect Export Legislation. Dr. Marks added that following her report to the last meeting, the Aust. Ent. Soc. had prepared a submission to the Australian Minister for Science and Consumer Affairs requesting repeal of the Legislation and also sent a copy to the Australian Minister for Customs. The Minister for Science and Consumer Affairs had replied that his Department would consider the submission.

Main Business

An address by Dr. G. W. Saunders, Director of the National Parks and Wildlife Service, Queensland Department of Lands, entitled "Some Aspects of Nature Conservation". Dr. Saunders is an entomologist with many years' experience in North Queensland with the Department of Primary Industries, more recently Director of the Fauna Conservation Branch of the Department and a Past President of the Society.

SOME ASPECTS OF NATURE CONSERVATION

(with particular reference to insect fauna)

The last occasion I addressed the Entomological Society of Queensland was when I delivered my presidential address. That was over six years' ago and it is with some misgivings that I no longer stand before you as a practising entomologist. Nevertheless, it is with great pleasure that I come before you as the first director of Queensland's National Parks and Wildlife Service. I am honoured that you would consider I am still able to make a contribution in the entomological forum. I hope I don't disappoint you.

The title "Some aspects of nature conservation" certainly leaves me plenty of scope. However, for the purposes of this talk I will define nature, then proceed to confine my remarks to one aspect. By nature conservation, I mean the conservation of fauna, flora and landscape. I would like to say a few brief words about landscape and flora, and then confine most of my remarks to fauna.

Quite often when the man in the street talks about conservation he is primarily concerned with the landscape. Take, for example, the issues of Moreton Island and Fraser Island. The majority of Brisbane people will never set foot on Moreton Island. Likewise the majority of Australians will never set foot on Fraser Island. We wouldn't want them to, not all at once anyway. The case for preserving Moreton Island certainly can't be built on its faunal aspects. A stronger case rests on flora, but the real case for preserving Moreton Island rests on its landscape value. The couple sitting on the beach at Redcliffe or fishing in Moreton Bay are never likely to have any first-hand knowledge of the fauna and flora of Moreton Island. They are conscious of the Island being there as part of the landscape, and they will fight for its conservation.

Land and landscape must be accepted as irreplaceable resources, whereas water, vegetation and animal life may be replaced and maintained. I do not wish to dwell on landscape in this paper, but suffice it to say that scientists working in this field can now evaluate landscapes from the points of view of aesthetics and conservation. The aesthetic evaluation is based on sensory perception, which may be made quantitative and exact by suitable surveys and measurements.

There is generally a floral component in most landscapes and in such cases protection of the landscape should automatically ensure protection of the flora. Similarly, protection of the habitat normally ensures the conservation of the fauna, dependent upon that habitat. This is not always the case. It is an aspect I will expand upon later. I imagine it is an aspect that concerns many entomologists. It throws up questions about how far we should go in Queensland in protecting individual species of insects and what restrictions will be placed upon the collecting of insects in the years to come.

Someone suggested to me, quite cynically, that the majority of national parks in Queensland are waterfalls, lakes and precipitous peaks. Whilst that is partly true, it is not necessarily a bad thing. There's an awful lot of good forest habitat surrounding the waterfalls and scenic views in Lamington National Park, for example.

My personal view is that you've got to take the good with the bad. Nature reserve proposals will come from all directions, and many national parks will be gazetted for purely political motives. I don't think that matters at all. The national parks and wildlife service will still pursue a policy of painstakingly surveying the flora, fauna and landscape of Queensland, from which it will initiate its own proposals. This is long-term investigational work and must proceed independently of the political and administrative vagaries of the day.

Ideally then, we reach a point in time when the nature conservation authority (that is my service) can say objectively and categorically to Government that these are the areas (A, B, C, D and so on) which must be set aside and reserved for these reasons (E, F, G). Any decision then by the elected decision-makers to do something else with those parcels of land is made in full knowledge of the facts and the consequences for nature conservation.

Now quite obviously people aren't going to sit back and mark time while the National Parks and Wildlife Service makes up its mind about which parts of Queensland should be national parks, which parts should be environmental parks and so on. Proposals will come in from politicians, conservation bodies, professional bodies, community action groups and so on. These must be evaluated, and in our new service we are establishing a structure that will facilitate the evaluation process to the best of our scientific and administrative ability.

The service has now been given a totally new structure - the old inherited fauna conservation branch from D. P. I. and national parks branch from Forestry no longer exist. A research and planning branch has been established staffed by zoologists and botanists, and in the future, geographers, plus the necessary ancilliary staff. The functions of the research and planning branch will be field studies research (zoological, botanical, geographical), including fauna and flora inventories (surveys, taxonomic investigations, data bank, bibliographies), nature conservation land-use research and planning including management research (evaluations, disturbance levels, game management, zoo technology).

The other main technical branch will be that of management and operations, staffed by parks and reserves officers, wildlife officers and rangers. The main functions of this branch will be the management of national parks, other nature reserves and sanctuaries, and the management of the State's wildlife. This will include the planning, design and construction of visitor facilities, on-site park interpretive services, monitoring and control of human and other influences, the use and control of fauna and flora industries in conservation, open seasons, aviculture, zoos, museums, permits and law enforcement.

The other branch will be the administration branch, which will have a technical section to cover the central technical functions such as information, public relations, drafting and cartography, library, statistics and general technical and scientific assistance to the Director.

So much for the broader aspects of nature conservation, I now wish to deal specifically with fauna conservation as it applies to insects and entomology.

In so doing I would like to commend the Entomological Society of Queensland for its report entitled - "Focus on Cape York". In this report, a good case for conservation of Cape York is put forward based upon its historical associations, the fact that it is the type locality for over 400 species of Arthropods, its unique fauna and flora and the isolation of its rain forests.

This is the sort of information the national parks and wildlife service would find difficult to obtain from within its own ranks. As yet it does not employ entomologists. I predict the time will come when it will employ entomologists. When it does, the task is so immense the service will always have to depend upon data being fed to it by university research workers and so on. Furthermore, it must never be assumed that the national parks and wildlife service holds all the keys to the conservation of our wildlife. There are many ways of achieving the same result.

As you know the origin of the Australian fauna and flora is not finally settled. There are strong similarities in some elements of the fauna and flora of all the southern land masses. For example, only the southern continents have raites, the ostrich in southern Africa, emus and cassowaries in Australia and Papua New Guinea, moas and kiwis in New Zealand, and rheas in South America. There is increasing Geological and Geomagnetic evidence to show that continental drift, in fact, has occurred, but the zoogeographic evidence is not decisive.

I have always felt that most entomologists favour the theory of southern origin for much of the flora and fauna. Evans favoured the theory that many homoptera could only be representatives of immigrants that had crossed from one southern continent to another, when these were in contact, as late as the Mesozoic. Paramonov believed in an antarctic origin for the main Diptera fauna. Key believes that although a few of the Acridoidea have recently entered Australia, the main fauna is old and autochthonous. I understand there are similar possibilities with molluscs, crustacea, and fish.

On the other hand, students of the Vertebrates usually look to Asia as the source of the fauna. There is very considerable evidence to support this view, but it is not possible to generalise yet. Frith believes in the northern route for mammals, birds and reptiles. However, there is no reason why all groups of taxa should have a common geographic origin.

The present fauna is typically an island one. It has many endemic forms, and many basic animal types are completely lacking. Of the sixteen forms of land mammals, only four are represented - the monotremes, the marsupials, the bats and the rodents. The only amphibians are frogs. The representation of birds is more complete with nineteen of the world's twenty-seven orders. The present-day fauna includes over 60,000 species of insects, some 130 species of amphibians, 392 species of reptiles, about 230 species of mammals, and over 700 species of birds.

Irrespective of the origin of its fauna, Queensland finds itself in a privileged position with the greatest diversity of fauna, flora and landscape of any other region of the Australian land mass, the greatest number of species of mammals and birds, and I suspect the greatest number of reptile and insect species.

As you are no doubt all aware, action was taken by my Department late last year to add two species of butterflies to the list of protected fauna in Queensland. I refer to the birdwing butterfly (Ornithoptera priamus), and the mountain blue butterfly (Papilio ulysses). This action sparked off some controversy, and if I remember correctly, was officially opposed by this Society. It was an attempt to control the unrestricted plundering of the species from the

wild for commercial purposes. At the time the new regulations were formulated, a pair of birdwing butterflies artistically mounted in a frame with some native flora was selling for \$40 in the Cairns tourist shops. There are one or two commercial butterfly breeders in the State whose operations we certainly do not wish to curtail. How their operations will fit into the provisions of the fauna conservation act have yet to be sorted out. It has been found from experience with aviculture that permission to keep, breed and trade in a species makes it extremely difficult to protect the wild stock from being plundered.

Protection of insects at the species level is a matter of concern in many countries. There is a strong move in Britain at the present time to do something about their butterflies at least in a comprehensive fauna protection bill expected to come before the parliament in the near future.

In Britain there are no restrictions on collecting, importing, buying or selling of butterflies, however rare or threatened, and a world-wide trade has developed that is still growing. One Kent dealer lists birdwings at £98 a pair. The growth in this trade may be compared with that in birds' eggs fifty years' ago. It is now illegal to take the eggs of most British birds.

Butterflies are conspicuous and easy to collect. The main demand is for large and showy species, the rarer the better. There is little trade in dull-coloured species. One of Britain's biggest dealers has not only produced a splendid catalogue with colour photographs of specimens for sale, but also colour pictures of butterfly jewellery including rings, necklaces, brooches, cuff-links, key-chains, and table-mats.

Dealers are constantly seeking new sources of material. An entomologist working in Africa recently received the following letter from a dealer in Europe -

"Gentlemen, we are trying to reach missions and missionaries in your section who might be able to supply us with butterflies. I am sure you know someone who might be interested in earning money in his spare time, as we pay from five cents each for common, to many dollars for rare butterflies . . . Many students can earn enough money in their spare time to help pay for their education . . . Enclosed find simple instructions and a few paper envelopes used for butterflies."

There are only 56 resident species in the British Isles, and of these it is estimated that 20 are threatened by the activities of dealers and collectors. Another species, the large copper became extinct in Britain about 1848 as the result of over-collecting, although it has subsequently been successfully reintroduced and may not be collected, being in a nature reserve. Particularly vulnerable species are those forming discrete local colonies. An examination of the nature conservancy's recently published provisional atlas giving the past and present distribution of the 56 resident species shows that many enjoyed a much wider range in the past, and although it may be that other factors, such as changes in the land-use and the use of pesticides, have caused this contraction of their range, it seems likely that collecting has contributed.

Not all concern for insect conservation is confined to the showy butterflies. Indeed we have a parallel here with the kangaroo. It is easy for conservation groups, representing a part of public opinion, to take up the cudgels for the large, spectacular species being completely oblivious to the needs of the small, the drab, the ugly, the unspectacular species.

In a recent article in the International Journal of Ecology and Environmental Sciences, Ming-Hing Wang of the Biology Department at the Chinese University of Hong Kong, said that perhaps the most unnoticed and neglected living organisms are the lower forms of plants and animals. Wong Chuk Hong in Hong Kong, a favourable sampling site of planarians, has disappeared and given way to a housing estate. The habitats of four newly found species of marine rove beetles of the genus Bryothinusa have gradually vanished because of the construction of the race course along the coast of the Tide Cove near Shatin; Wang lamented that there had not even been sufficient time to study the new species before their disappearance.

And, of course, there are many other examples of species and populations which are threatened with either extinction or serious depletion for one reason or another. The questions to which I must address myself are:- What are our nature conservation priorities in Queensland? Do we approach the problem entirely from habitat? What weight do we place on species protection? Ideally, whole natural areas should be preserved where life can flourish in all its complex variety - virgin forests and grasslands; and mountain, wetland, coastal, fresh and salt water habitats.

The requirements for saving endangered species demand more than the content of Ecology. Saving an endangered species may involve saving its habitat even before we fully comprehend the functioning of the ecosystem to which it belongs. The accumulation of data by itself does not advance the cause of conservation; and there is some danger in believing that it will. The white-tailed deer in North America was probably restored and managed as successfully as any species of threatened wildlife; and this was accomplished without first describing the entire forest with all its living and non-living components. Wildlife biologists at that time knew little about energy flow as related to deer and less about mineral cycling. Admittedly, many mistakes were made in early conservation efforts. There was an early failure to recognise the role of predators. Often natural communities were managed in a lop-sided fashion, favouring certain species to the detriment of others in the system.

The fundamental idea of a system is that its diverse units function or operate as an integrated whole. So it is with an ecosystem which is the basic unit on which the preservation of an endangered species depends.

The natural associations of a plant and animal community are not a simple collection of separate entities, any one of which can be changed without regard for the others but involve many intricate inter-relations in composition, function, and structure. The two notions that intervene between the concept of an ecosystem and the single animal must be taken into account. Let us briefly remind ourselves of some basic biology. Numbers or aggregations of the same animal are known as populations, and the various living populations in a given area are known collectively as a community. Some animals can thrive in a wide variety of conditions and may be represented in a number of communities. Conversely, others are specialised and may be limited to a single community.

Every animal species has a definite geographic range encompassing one or more types of plant communities. Its distribution within this range is influenced by environmental factors. Distribution may be limited by food, cover, competition with a harder species, or several limiting factors may work together. Each species is dependent on one or more plants, or plants and animals, and on some specific condition of soil and water.

Both distribution and abundance of a species are influenced by the condition of an environment which is constantly changing. I think we can say that even in Queensland all biotic communities are now influenced in some way by man's activities. Understanding the nature and magnitudes of these influences, and bringing adverse influences under control, is the conservation goal of environmental ecology.

There are several concepts in ecology that give it uniqueness among biological studies. The concept of environment used in ecology has obvious significance to the technical application of environmental biology. The detection of biological effects of interactions among environmental factors in a given situation is one of the main tasks of ecology. The concept of an integrated living and non-living system and its functional stability or instability is basic to any long-term ecologically-based conservation programme. Although a unifying approach has not yet been developed to appraise the long-term influence of the flow and cycling of energy and material in ecosystems, these concepts are receiving a great amount of attention in the field and in the computer programmes of theoretical ecology. They need to be integrated into a consistent and workable system for the organisation of data for action programmes.

It is doubtful whether Queensland possesses any threatened species in the sense that that term is used to describe the status of species such as the whooping crane and the vicuna. I know of no insect species which could be given a "threatened with extinction" label. Your conservation committee may be able to enlighten me.

There are many truths to be learned if we probe at length into the ecology of individual species. Queensland is probably one of the few places left in the world where we have some time left in which to do that. But we must exercise stewardship and wisdom in allocating our time and resources to what is now a luxury in most other countries.

The central theme of the ecological concept - the idea of the ecosystem - should be applied. Most of the endangered species will survive only if the ecosystems in which they live remain intact or if they can adapt to a changed environment. The concept of an ecosystem is a very broad one, based not on size, nor on the number of interacting parts, but on the functional stability for a given period of time. It is conceived as a dynamic rather than a static situation. Successful conservation programmes cannot be based on a preoccupation with saving the animal by itself. Its total environment must be preserved. The complexity of this undertaking can be realised as one considers the fragility of some associations; and appreciates the amount of tinkering that has occurred with most biotic communities.

In his address to the symposium on changing patterns in entomology entitled - "Looking Forward : What of the Next Fifty Years?" Professor Kettle highlighted some of the problems facing the nature conservation authority in Queensland, particularly with regard to the management of the numerous small national parks. I wholeheartedly agree with him, and have also taken note of his plea for an ecosystems rather than a species approach. For the insect fauna generally this will certainly be the case.

For those of you who are interested in what I consider to be the best British community studies on invertebrates, I can only recommend you read the relevant chapters on the ecological studies of Wytham Wood in Charles Elton's book "The Pattern of Animal Communities". The other classical studies in this area have been undertaken at Monks Wood, and in this regard I would recommend the nature conservancy publication of 1973 entitled, "Monks Wood - A nature reserve record".

For some species, though, particularly those of high economic, scientific or aesthetic importance to man, a more critical surveillance is required. Many of this group are mobile animal species which may not be confined to a single biotic community, and others are species subject to exploitation by man in numbers that exceed the potential rates of annual recruitment. In these categories, the vertebrate animals are of particular importance. They require a continuing inventory of their status and of the factors influencing their abundance and distribution. It is obvious that those responsible for placing the birdwing and mountain blue butterflies on the protected list in Queensland considered them to be in this category.

The matter of kangaroo conservation raises its head at this point. As I have expounded upon that subject on several occasions in the past few years, I do not intend discussing it in my address tonight.

CONCLUSION

As I said earlier, Queensland is in a particularly privileged position in regard to nature conservation. Not only has it got the fauna, it still possesses large tracts of natural habitat, and in Cape York Peninsula one of the last of the world's diverse wilderness areas. There is still time - we estimate about ten years - in which to implement a nature conservation programme that will ensure that every habitat type is reserved in some way. How much better this is than having to resort to restorative action that is so much a part of the nature conservation programmes of Britain, Europe, Japan and other highly developed areas.

Discussion

Dr. Marks. When Forestry Dept. assumed control of National Parks in Queensland some years ago, they pursued a policy of encouraging scientists and the general public to use State Forests in preference to National Parks. Will this policy continue?

Dr. Saunders. Yes. We hope to develop recreation areas in State Forests wherever possible to take some of the pressure away from the Parks and to limit disturbance to defined areas.

Mr. Yule. One other reason for Forestry Department's policy was that State Forests are often more accessible than some of the Parks and visitors were more likely to use them. There is also the fire risk and by creating defined recreation areas this risk can be minimised.

Mr. Tuhan. Are insects protected in National Parks?

Dr. Saunders. Yes. All animal and plant life in National Parks is fully protected. We see the protection of insects being achieved by habitat protection except where perhaps a species may be endangered by commercial exploitation in which case we may protect the species by law.

Dr. Exley. You defined "Nature" as including flora, fauna and the landscape. Do you see education of people to appreciate and value this heritage as part of your function and how will you work in this direction?

Dr. Saunders. Yes. We would encourage the Education Dept. through Schools and the Queensland Museum to adopt this role. Our efforts will be concentrated on Information Centres at the major National Parks where visitors can obtain information from trained staff about the Park and its flora, fauna, etc.

Dr. Stone. How do you see your relationship with the Honorary Rangers Association?

Dr. Saunders. We do what we can with our available staff to protect the National Parks but we value highly the assistance of Hon. Rangers. We have held and will continue to hold seminars to educate these persons about the Parks.

Dr. Miles. Do you regard feral domestic cats as a problem in Parks?

Dr. Saunders. We have no data on the effect of feral cats on the fauna but we assume them to be causing damage. We hope to conduct research on the levels of disturbance caused by introduced pest species such as the feral cat.

Mr. Kay. Do you have any data on the effects of wild pigs in Parks and their population size in Queensland?

Dr. Saunders. Not as yet. We have just begun a research program to look at wild pigs.

Dr. Reye. What is the situation regarding the inter-tidal zone? Who has control over these areas?

Dr. Saunders. Such areas are partly under our control and partly under the control of Fisheries Department. Our control is limited to Marine National Parks where the same provisions as apply to terrestrial parks are enforced.

Mr. De Baar. The two species of butterfly protected in Queensland are quite common where they occur and probably in little danger of over-exploitation. Yet clearing of rain forest which destroys their habitat is still occurring. Surely control over this clearing is more important than protection against exploitation?

Dr. Saunders. We have no control over freehold land clearing. On other land all we can do is present a submission for protection to the Government who is the deciding body.

Mr. Hammond. To be consistent with your policy of protecting exploited species you should also prohibit the taking of the Golden Stag Beetle Phalacrognathus muelleri which is in great demand by collectors.

Dr. Saunders. To date we have not received any request for protection of this species as was the case for the two butterflies.

Dr. Exley. You mentioned that action by your section was not the only way to achieve habitat protection. Can you give some examples?

Dr. Saunders. Local Authorities can assist by declaring reserves, zoning land for recreation, etc. Landholders can request that their property be declared fauna and flora reserves.

Mr. Swindley. What conditions must be met before your section will create a flora and fauna reserve on private property?

Dr. Saunders. Primarily that the landholder continues to provide for the well being of the flora and fauna.

Dr. Bensink. You have emphasized the need to protect habitat in order to protect many species of animals. Does your Service carry out research to determine how much habitat should be preserved?

Dr. Saunders. We rely heavily on Universities and other research organisations for much of this information. Often if an area appears worthy of protection and this can be granted we will secure it and carry out research in the area as time permits.

Dr. Rye. Will your Dept. encourage bodies such as Local Authorities to employ biologists to care for their biota?

Dr. Saunders. We have and will continue to do so. I think this will become more and more common in the future. I consider that Environmental Science Graduates from Griffith University will have a role in this situation.

Dr. Marks. What role do you see for Societies such as ours? Many Societies are anxious to assist but how can they best operate in a constructive way?

Dr. Saunders. I would envisage an advisory panel with representatives from such Societies promoting closer ties with our Service. Work done by Societies such as your "Focus on Cape York" Report are extremely useful in making decisions. Apart from the scientific bodies Conservation Groups can also assist by encouraging public awareness of conservation issues.

Mr. Storey. You admit that you rely heavily on research carried on outside your Section, yet you make it very difficult to obtain permits to collect specimens in National Parks. Do you intend any relaxation of the conditions for reputable workers?

Dr. Saunders. We believe the protection of the Parks is of paramount importance and that the conditions we impose on permits are reasonable as pressure for exploitation of the environment is increasing more and more. However we do intend to review the present procedure.

Vote of Thanks. Dr. Exley thanked Dr. Saunders for his interesting address which clearly outlined the various roles of the newly created National Parks and Wildlife Service and its associations with researchers and their Institutions. The appreciation of the audience could well be gauged by the length and intensity of the discussion period. This vote was carried by acclamation.

The President reminded members of the somewhat unusual venue for the next meeting and after closing the business of the evening invited all present to supper.

IMPORTANT PESTS OF AGRICULTURAL CROPS IN QUEENSLAND. PART 8.

Cabbage White Butterfly - *Pieris rapae* L.

This ubiquitous pest of many cultivated crucifers - cabbages, cauliflowers, broccoli, wong-bok, radish, turnip, rape - also has a profusion of wild cruciferous hosts of which bitter swinecress, shepherd's purse and wild mustard are but local examples. The adult is depicted on the News Bulletin cover in the second row from the bottom.

After emerging from the yellow spindle-shaped eggs, the larvae feed around the oviposition site until the third instar, when they forage further afield. Larvae appear to feed all over the plant and their characteristic irregular feeding holes, more obvious on the outer leaves, are quite distinct.

P. rapae pupae attach to the leaf surface by a silken cremaster and girdle; less frequently on surfaces away from the food plant.

P. rapae adults have obvious forewing patterns as sexual characters and are commonly found, in the Redlands at least, all year round. Their numbers in spring-autumn are more prolific when, in bad seasons, they form a gyrating cloud over cabbages and cauliflower fields.

The distribution of *P. rapae* has shown an extensive Euro-Asian proliferation. The spread to Quebec in 1850-60 allowed its subsequent spread, via the eastern seaboard states, into the U.S.A., and by 1898 into Mexico and Hawaii. New Zealand recorded its presence in Napier in 1930 and it had spread to Victoria by 1939. The earliest Branch recording shows its appearance in Toowoomba in 1942. Its subsequent dissemination to brassica crop areas of the state added yet another cohort to the ranks of cabbage cluster grub, centre grub, diamond backed moth, cluster grub and corn earworm; already an army of occupation in cole crop areas.

Under the present agronomic conditions it is conceded that naturally occurring micro-biological, arthropodan or avian regulants are not effective enough in allowing the production of market standard cole crops.

Reliance has been traditionally placed on chemical control. Initially as dust formulations of derris, lindane or DDT, using rotary or bellows dusters. The convenience and better coverage of pressure spray rigs heralded the advent of endrin usage. Diazinon, hitherto a largely veterinary product, has been the Branch's recommendation for some time, with methomyl as a backstop especially during the withholding period prior to market.

Although *Bacillus thuringiensis* in the form of "Dipel" and "Thuricide" has been extensively used on screening trials at Redlands, its inferior control of diamond backed moth remains a problem. By contrast, methamidophos, at comparable cost, gives adequate control of the six major pest species.

Current investigations have centred around the development of an acceptable style of spray using *B. thuringiensis*. Chlorodimeform and *B. thuringiensis* at reduced rates have shown promise, and programmes of induction of stress situations with sublethal insecticide doses, in combination with *B. thuringiensis*, are planned for next autumn.

John R. Hargreaves,
Department of Primary Industries,
Redlands.

A SIMPLE METHOD OF ANALYSING LIFE TABLES OF *PIERIS RAPAE* L.

Life tables of four generations (late spring 1973, summer 1973-1974, winter 1974, early spring 1974) of the cabbage white butterfly, *Pieris rapae* L., in Brisbane were set up to determine key mortality factors for this pest.

Eggs deposited on potted cabbage leaves in a glasshouse were placed in a field plot on the University of Queensland campus, Brisbane, on the day of oviposition. Approximately the same numbers of eggs were kept on potted cabbages in experimental cages in the glasshouse. The survival from egg to adult was compared between insects in the field and in the glasshouse to reveal the extent of mortality due to weather factors.

The numbers of survivors were counted every two days. Frequent counting enabled easier identification of mortality factors. Before the eggs hatched, the pots in the field were enclosed in a nylon net to prevent egg deposition by wild adults. Most of the larvae were observed to pupate below the "lip" of the pot. A ring of netting surrounding the pots offered additional pupation sites. The number of adults emerged was easily determined by counting the empty pupal cases present.

The graphical method of analysis of Varley & Gradwell (1960) was adopted, because it is simple and the important mortality factor(s) can be determined easily by visual inspection. The k -value i.e. the "killing power", is the difference between the logarithms of the population before and after the mortality factor acts (Varley *et al.*, 1973).

Fig. 1 indicates the importance of disease in contributing to the total mortality trend of the four generations. Weather contributed an almost constant mortality influence in every generation. Parasites were important only in the first generation.

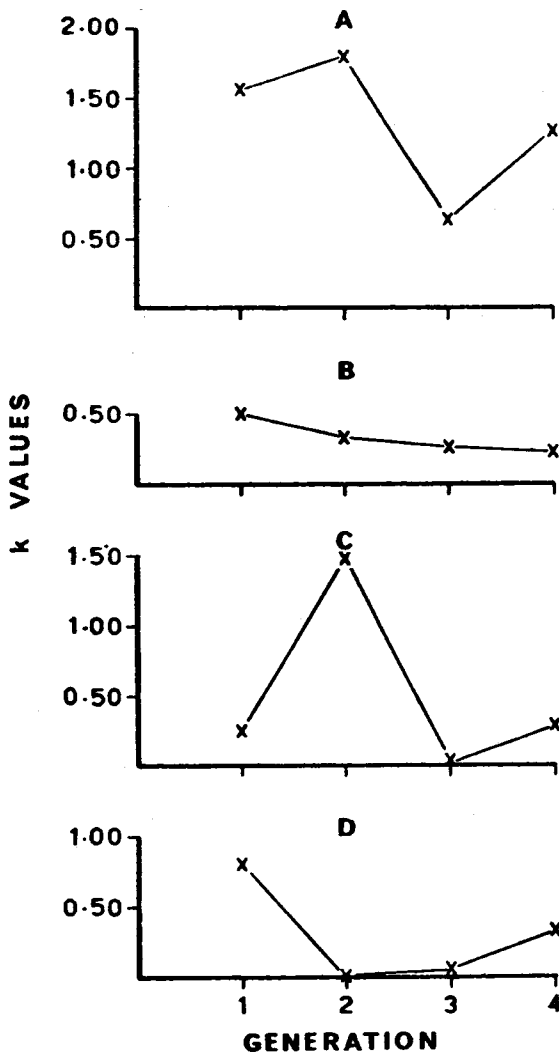
In south-east Queensland, natural populations of *P. rapae* are very susceptible to granulosis virus disease (Teakle, 1969). The disease seemed to be severe in the second generation i.e. the midsummer generation when south-east Queensland is usually hot and wet. Larvae in a high moisture environment tend to be very susceptible to disease, and the hot conditions probably enhance multiplication of disease-causing micro-organisms.

Parasites were important only during the spring season. The killing power of the parasites is higher during the late spring (generation 1) than during the early spring (generation 4) (Fig. 1). This could indicate a larger population density of parasites during the late spring. In the U.S.A., Parker *et al.* (1971) discovered the overwintering population of *P. rapae* parasites to be small and ineffective in suppressing the sudden increase in populations of *P. rapae* during the spring. Thus there was a lag between the increase in *P. rapae* populations and *P. rapae* parasites.

S.T. Hassan, Dept. of Entomology, University of Queensland.

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Varley, G.C. & Gradwell, G.R. (1960). Key factors in population studies. *J. Anim. Ecol.* 29: 399-401.
Varley, G.C., Gradwell, G.R. & Hassell, M.P. (1973). - "Insect population Ecology", p. 7, (Blackwell: London).



The figure above shows the trend of mortality in four generations of *P. rapae* in Brisbane (1973, 1974). The 'k' values represent 'killing power' ($\log_{10} N/S$), where N is the number of insects before the mortality factor acts, and S the number of insects surviving after mortality.

- A shows total mortality trend
- B shows mortality due to weather
- C shows mortality due to disease
- D shows mortality due to parasites

WAU ECOLOGY INSTITUTE

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Opening of the Szent-Ivany Laboratory

A special event in Papua New Guinea biology will take place at Wau in the beautiful highlands of New Guinea on November 3 when there will be a gathering for the dedication of the SZENT-IVANY LABORATORY at the Wau Ecology Institute. Following the dedication a symposium on Conservation in Papua New Guinea will be held on November 4 and a workshop on the Role and Future of the Wau Ecology Institute on November 5.

The laboratory is being named after Dr. and Mrs. J. J. H. Szent-Ivany who will both travel from their home in Adelaide to be honoured guests at the celebrations. Joe Szent-Ivany played an important role in the development of both pure and applied entomology in Papua New Guinea during his many years as senior entomologist with the Department of Agriculture, Stock and Fisheries in Port Moresby. His wife, Maria, is well known as a plant and insect illustrator. Joe has continued his contribution to New Guinea entomology during his retirement by preparing a major work, "Economic Insects of Papua New Guinea", which is soon to be published by the Bishop Museum in Hawaii.

The new laboratory will be a fine addition to the range of facilities which include accommodation, bench space, transport, high altitude stations and expert guidance already offered by the Institute to visiting biologists during long- or short-term stays.

High Honour to Ecology Institute Director

It is fitting to record here the awarding of the Gregory Medal to the Wau Institute's Director, Dr. J. Linsley Gressitt, at the August meeting of the Pacific Science Congress in Vancouver. This important award is made by the Congress each four years for meritorious service to Pacific science. Among Lin's contributions in this field have been a virtual lifetime's work in China, S.E. Asia, Micronesia, Hawaii, Polynesia, Melanesia, Antarctica and Australia. During this period he has built the Entomology Department of the Bishop Museum up to the stage where its collections are now the third largest in the U. S. A. and the second largest in terms of staff, research activities and publications. His own publication record on systematic and zoogeographic studies on the Pacific insect fauna is outstanding, and he has also contributed greatly to the publication avenues of the region by the establishment of two important journals, Pacific Insects and Journal of Medical Entomology.

BUTTERFLIES RECORDED FROM NORTH QUEENSLAND DURING AUGUST TO NOVEMBER, 1974

The opportunity arose during 1974 for a collecting trip to North Queensland, with an extended stay at Iron Range. Although the main interest was Diptera, most insect orders were taken. The butterflies encountered during this trip are listed here.

The Daintree River-Cape Tribulation records were taken during two trips of three and five days in August. The area consists of large tracts of rainforest extending to the sea, but extensive land clearing has been carried out during the past few years. Generally butterflies were plentiful, and in fresh condition. Many species were very local, being taken at one or two small areas. This was the case with Alloa doleschalli, doleschalli, Euschemon rafflesia alba, Delias ennia nigidus, Narathura wildei wildei, Danis cyanea arinia, and Jamides aleuas. Specimens of Ornithoptera priamus euphorion, Papilio ulysses joesa and Vindula arsinoe ada were abundant but difficult to catch.

We arrived at Iron Range by road on August 26 and departed on November 2. The fauna was found to be not quite as abundant as it had been at Cape Tribulation. During the first two weeks of the visit intermittent rain with an occasional heavy shower was the order of the day, but it was also the only time insects, and especially butterflies, were abundant. The following six weeks were fine and hot, with an occasional storm and a corresponding upsurge in insect populations for a few days after. However, as mid-October approached, humidity began to rise noticeably, and a different insect fauna began to appear. The full extent of this change could not be observed as it was necessary to leave early in November.

Many people had been adamant that the area would be devoid of butterfly life during this dry time of year. Certainly many recorded species were absent, but with meticulous searching many species were encountered. Larvae of two species of Narathura were found, but could not be bred through to adults. Larvae of Hypochrysops theon medocus were found feeding on the fern Drynaria quercifolia and this life history is being recorded elsewhere (Daniels, in prep). Larvae of Delias ennia tindalii were found feeding on a peculiar rambling mistletoe growing on Melaleuca. The final instar larvae of this species were most peculiar in having three distinct colour phases prior to pupating. During the first week of September a female Ornithoptera priamus macalpinei was observed depositing eggs on Aristolochia. A search around the base of the vine revealed several pupae the last of which emerged in December 1974. Several pupae of Delias aruna inferna were found at the base of a rainforest tree, between 30 cm and 150 cm above the ground.

Three sightings of the New Guinean nymphalid Apaturina erminea were recorded during October. Although it was not possible to net the species there was little doubt of the identity of this distinctive species which is not recorded in the literature from Australia. A migration of Badamia exclamationis exclamationis began during late October at Iron Range, and was still in progress on November 2. Specimens averaged about 30 per minute, flying approximately SSE. At Cairns on November 4, specimens were observed migrating approximately south, numbering about 10 per minute, and at Westwood, west of Rockhampton, on November 9, two specimens were observed flying in a southerly direction.

A glance at the list of Iron Range species given by Montheith (1972) shows that little or no collecting of Lepidoptera has been undertaken at Iron Range during August, September and October. From the list following many species would now appear to occur there as adults throughout the year. Montheith lists 140 butterfly species from Iron Range, to which Atkins (1975) and Miller (1975) each add an additional species. The present trip yielded 98 species, excluding the sightings of Apaturina erminea.

In the list below, an asterisk indicates the species was either damaged and not retained for the collection, or not netted but identified on the wing. The letters, A, S, O and N represent the months August, September, October and November respectively.

Species Recorded	Iron Range Area August 26 - Nov 2 1974				Daintree River- Cape Tribulation August, 1974
	Aug	Sep	Oct	Nov	August
HESPERIIDAE					
<u>Allora doleschallii doleschallii</u>		S	O		A
<u>Euschemon rafflesia alba</u>					A*
<u>Badamia exclamationis exclamationis</u>		S	O*	N*	
<u>Tagiades japetus janetta</u>		S	O*		A
<u>Toxidia inornata inornata</u>	A*	S			
<u>Neohesperilla crocea</u>		S	O		
<u>Notocrypta waigensis proserpina</u>		S	O		A
<u>Ocybadistes flavovittatus ceres</u>			O		
<u>Ocybadistes walkeri sonia</u>	A				
<u>Ocybadistes ardea heterobathra</u>	A	S			
<u>Suniana lascivia neocles</u>	A				A
<u>Suniana sunias reactivitta</u>	A	S			
<u>Arrhenes dschilus iris</u>	A	S	O		A
<u>Telicota augias krefftii</u>		S	O		A
<u>Telicota ohara ohara</u>		S	O		A
<u>Telicota mesoptis mesoptis</u>	A	S	O		A
<u>Cephrenes augiades sperthias</u>					A
<u>Sabera caseina albifascia</u>	A	S	O		A
<u>Sabera fuliginosa fuliginosa</u>					A
<u>Sabera dobboe autoleon</u>					A
<u>Pelopidas lyelli lyelli</u>			O		
PAPILIONIDAE					
<u>Graphium sarpedon choredon</u>	A	S*	O*	N*	A
<u>Graphium agamemnon ligatum</u>					A
<u>Graphium eurypylus lycaon</u>		S			
<u>Graphium macfarlanei macfarlanei</u>				N*	
<u>Graphium agamemnon ligatum</u>		S	O*	N*	
<u>Graphium aristeus parmatum</u>			O		
<u>Papilio aegaeus aegaeus</u>	A*	S	O*	N*	A
<u>Papilio ambrax egipius</u>					A
<u>Papilio ulysses joesa</u>	A	S	O	N	A*
<u>Cressida cressida cressida</u>			O	N	A
<u>Pachliopta polydorus queenslandicus</u>	A	S	O	N	A
<u>Ornithoptera priamus macalpinei</u>	A*	S	O	N	
<u>Ornithoptera priamus euphorion</u>					A*

Species Recorded	Iron Range Area August 26 - Nov 2 1974				Daintree River - Cape Tribulation August, 1974
PIERIDAE	Aug	Sep	Oct	Nov	August
<u>Catopsilia pomona pomona</u>		S*	O*	N*	
<u>Eurema candida virgo</u>	A	S			
<u>Eurema hecabe phoebus</u>	A*	S	O*	N*	A
<u>Eurema laeta lineata</u>	A	S	O*	N*	
<u>Elodina angulipennis</u>	A	S	O		
<u>Delias argenthona argenthona</u>			O*		
<u>Delias mysis mysis</u>					A
<u>Delias mysis waterhousei</u>	A	S	O	N	
<u>Delias emnia nigidius</u>					A
<u>Delias emnia tindalii</u>	A	S	O		
<u>Delias aruna inferna</u>	A*	S	O*	N*	
<u>Delias nigrina</u>					A
<u>Appias paulina ega</u>	A				
<u>Appias ada caria</u>	A	S	O	N	A
NYMPHALIDAE					
<u>Danaus plexippus plexippus</u>			O*		
<u>Danaus chrysippus petilia</u>			O*		
<u>Danaus affinis affinis</u>	A	S	O*	N*	A
<u>Euploea sylvester sylvester</u>		S			A
<u>Euploea eichhorni</u>					A
<u>Euploea tulliolus tulliolus</u>					A
<u>Euploea darchia niveata</u>					A
<u>Tellervo zoilus zoilus</u>					A
<u>Tellervo zoilus gelo</u>	A	S	O	N	
<u>Melanitis leda bankia</u>	A*	S	O*	N*	A*
<u>Elymnias agondas australiana</u>	A	S	O*		
<u>Mycalesis sirius sirius</u>	A	S	O*	N*	A
<u>Mycalesis terminus terminus</u>	A	S*	O*	N*	A
<u>Mycalesis perseus perseus</u>	A*	S	O*	N*	A
<u>Hypocysta irius</u>		S			
<u>Hypocysta adiante adiante</u>	A	S			
<u>Hypocysta angustata angustata</u>	A	S	O		
<u>Ypthima arctoa arctoa</u>	A	S	O	N	
<u>Polyura pyrrhus sempronius</u>	A*		O*		
<u>Phaedyra shepherdii latifasciata</u>	A	S	O		A
<u>Neptis praslini staudingerea</u>	A	S	O*		A
<u>Pantoporia venilia moorei</u>	A	S	O		
<u>Pantoporia consimilis consimilis</u>	A	S			A
<u>Mynes geoffroyi guerini</u>		S			
<u>Doleschallia bisaltide australis</u>		S	O	N	
<u>Hypolimnas bolina nerina</u>	A*	S*	O*	N*	
<u>Hypolimnas alimena lamina</u>	A*	S	O*		
<u>Yoma sabina parva</u>	A	S	O*	N*	
<u>Precis hedonia zelima</u>	A*	S	O	N*	
<u>Precis villida calybe</u>			O*		
<u>Precis orithya albicincta</u>	A	S	O	N	A
<u>Cethosia cydippe chrysippe</u>		S*	O	N*	A

Species Recorded	Iron Range Area August 26-Nov 2 1974				Daintree River - Cape Tribulation August, 1974
	Aug	Sep	Oct	Nov	August
<u>Vindula arsinoe ada</u>	A*	S*	O*	N*	A
<u>Cupha prosope prosope</u>	A	S	O	N*	A
<u>Acraea andromacha andromacha</u>		S	O		
<u>Apaturina ? erminea</u>			O*		
LYCAENIDAE					
<u>Hypolycaena phorbas phorbas</u>		S			
<u>Hypolycaena danis turneri</u>		S			
<u>Narathura wildei wildei</u>					A
<u>Narathura araxes eupolis</u>		S	O		A
<u>Narathura madytus</u>		S			A
<u>Narathura micale amphis</u>					A
<u>Narathura micale amytis</u>	A	S	O		
<u>Hypochrysops theon medocus</u>	A	S	O		
<u>Hypochrysops hippuris</u>	A	S			
<u>Hypochrysops apelles apelles</u>	A	S	O	N*	
<u>Hypochrysops apollo phoebus</u>		S	O*		
<u>Hypochrysops elgneri barnardi</u>		S	O	N	
<u>Hypochrysops narcissus narcissus</u>		S			
<u>Pseudodipsas eone iole</u>		S			
<u>Danis danis serapis</u>					A
<u>Danis cyanea arinia</u>					A
<u>Nacaduba biocellata biocellata</u>					A
<u>Nacaduba berenice berenice</u>					A
<u>Ionolyce helicon hyllus</u>	A				
<u>Erysichton palmyra tasmanicus</u>		S			
<u>Jamides alevas coelestis</u>					A
<u>Jamides cytus claudia</u>	A	S	O	N	
<u>Jamides phaseli</u>		S			
<u>Anthene seltuttus affinis</u>		S	O		
<u>Theclinessthes onycha onycha</u>			O		
<u>Lampides boeticus</u>	A	S		N	
<u>Catochrysops panormus platissa</u>	A	S	O	N	A
<u>Zizeeria alsulus alsuhis</u>			O		
<u>Everes lacturnus australis</u>	A	S	O	N	
<u>Candalides helenita helenita</u>	A	S	O		A
<u>Candalides absimilis</u>		S			A
<u>Candalides erinus erinus</u>		S	O		
<u>Philiris kamerungae lucina</u>		S			
<u>Philiris innotata evinculis</u>	A	S	O	N	
<u>Praetaxila segecia punctaria</u>					
<u>Euchrysops cnejus cnidus</u>					A

Acknowledgment

Special thanks are due to Mr. E. Edwards, Division of Entomology, C.S.I.R.O., Canberra for identifications of most of the Hesperiidæ.

G. Daniels,
98 Harris Street,
FAIRFIELD, N.S.W. 2165.

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ABOUT PEOPLE

Harry Wharton and Jim Nolan of the CSIRO Long Pocket Laboratories attended a meeting of the Australian Society for Animal Production in Lismore on October 6 at which Harry delivered a controversial address entitled "Can New South Wales live with the Cattle Tick?".

Rob Sutherst has recently returned to his position at CSIRO Long Pocket after spending a year working at the Silwood Park Laboratories of the Imperial College of London. On his way back to Australia he visited a number of laboratories in South East Asia. Gunter Maywald has just been appointed Rob's new assistant at Indooroopilly.

Andrew Farnham from the Rothamsted Experiment Station, Hertfordshire, England, visited the CSIRO Long Pocket Laboratories on Monday, 6th October, and gave a seminar on resistance to pyrethroids in house flies.

Ken Harley has left on a three month tour of weed control laboratories in Asia, Europe and North and South America. He is currently in South America.

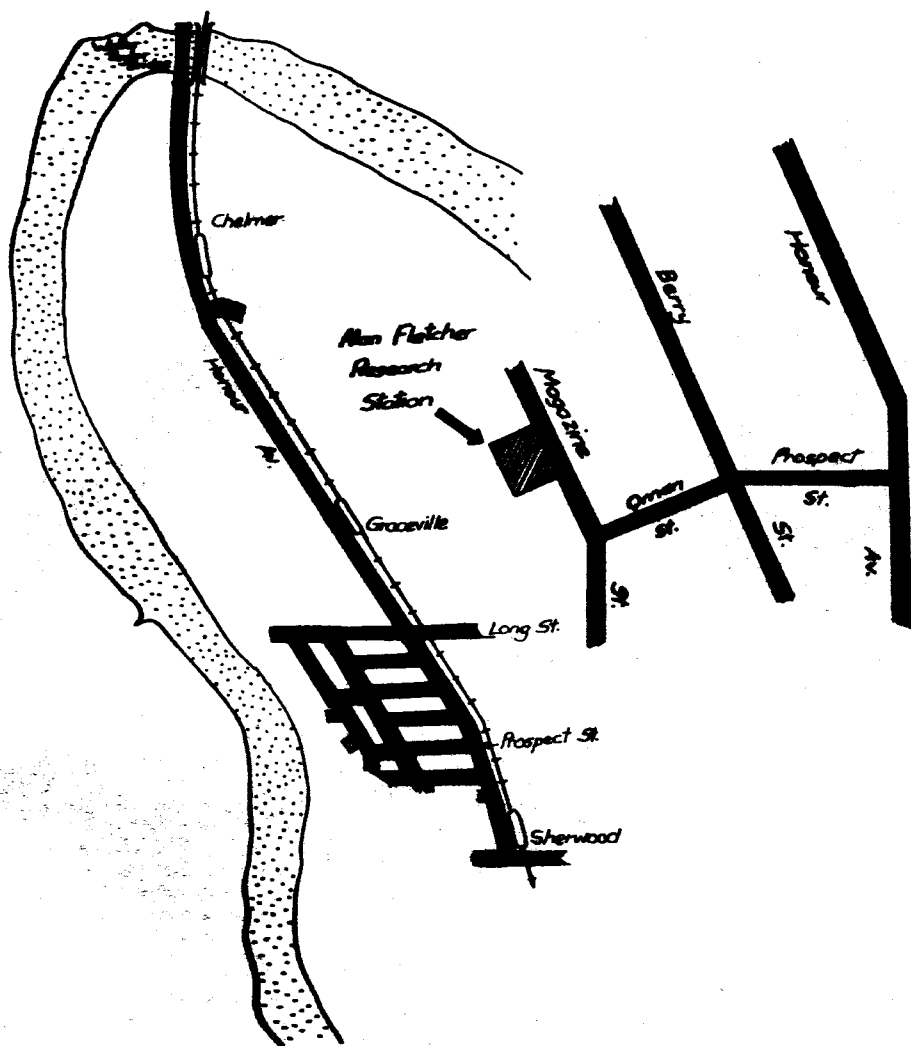
Drs. N. C. Tuhan and T. R. Kem, entomologists with the Indian Ministry of Agriculture are visiting Queensland during October as part of a Colombo Plan sponsored tour of Australia. They are especially interested in the biological control of insects and will be visiting most entomology institutions.

Tom Passlow, Director of Entomology in the Department of Primary Industries, will be spending a week visiting Entomology Branch installations in North Queensland from 27 to 31 October.

Rod Elder, of DPI Rockhampton, departs on October 1 on his annual week-long survey of spur-throated locust populations which takes him out to Western Queensland, up to the Gulf of Carpentaria and back to Brisbane along the coast. Ian Galloway of Brisbane DPI will accompany him and will be collecting microhymenoptera.

Clyde Wild has left the Entomology Department at the University of Queensland and has commenced duty at the Alan Fletcher Research Station of the State Department of Lands working as an entomologist in their weed biocontrol programme. He will be initially concerned with Harrisia Cactus (Eriocereus spp.) which are currently causing concern in some areas of this State. Clyde intends continuing his Ph.D. studies on biting midges.

Peter Miles, of the Entomology Department of the Waite Agricultural Research Institute, Adelaide, visited the Entomology Department at the University of Queensland on 14-16 October for discussions of mutual problems. Other visitors to the Entomology Department at the same time were Mr. Djamhur and Mr. Rampengan from Indonesia who were visiting Australia under the Indonesian Assistance Scheme.



ROUTE TO THE ALAN FLETCHER RESEARCH STATION - 27 MAGAZINE STREET,
SHERWOOD, BRISBANE.

ERRATA

The following corrections should be made to the article on butterfly foodplants by Mr. Andrew Atkins which appeared in News Bulletin Vol. 3, No. 7:

p. 117 - for Procidia phryna read Procidia polysema

p. 118 - for Scrophulariaceae read Scrophulariaceae

p. 119 - for Ogyris genoveva genoveva read Ogyris genoveva duaringa,

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NOTICE OF NEXT MEETING

The next meeting of the Entomological Society of Queensland will be held at 8.00 p.m. on Monday, 10th November, 1975, at the ALAN FLETCHER RESEARCH STATION, 27 Magazine Street, Sherwood, Brisbane. The main business of the evening will be an inspection of the new quarantine facilities at the station, followed by an address by the Director.

Supper will be served at the station after the meeting. A sketch on the inside back cover of this News Bulletin shows the location of the Station.

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.