

M. SCHNEIDER



NEWS BULLETIN

ENTOMOLOGICAL SOCIETY
OF QUEENSLAND



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GENERAL MEETING

Minutes of the General Meeting of the Entomological Society of Queensland Inc., held in Room 323 of the Hartley Teakle Building, University of Queensland on Monday 14th April, 1980.

Attendance: R. Wylie (Junior Vice-President), D. Anderson, A. Arthington, M. de Baar, M. Bengston, P. Boreham, B. Cantrell, E. Dahms, C. Eisemann, I. Fanning, I. Galloway, J. Grimshaw, C. Hagan, M. Harbison, B. Kay, M. Keeratikasikorn, H. Lake, C. Lamprecht, D. Merritt, P. Mottram, R. Piper, R. Raven, E. Reye, P. Room, D. Sands, M. Schneider, E. Sinclair, R. Teakle, K. Walker, T. Wright.

Visitors: T. Cribb, C. Freebairn, J. Lamy, B. Sorby-Adams.

Apologies: Prof. D. Kettle, E. Exley, F. Swindley, H. Standfast, G. and S. Monteith, B. Sabine, E. Marks, M. Harris, L. Moxon, P. and R. McFadyen.

Minutes: Minutes of the general meeting held on the 10th of December, 1979 at Griffith University were circulated in News Bulletin Vol.7 No. 9.

It was moved C. Hagan, seconded I. Galloway that the minutes be accepted.

CARRIED.

Nominations: The following nominations were received:-

For associate membership -

Mr. J. Conran	41 Runic Street, Rainworth.
Miss B. Sorby-Adams	18 Musgrave Street, Fig Tree Pocket.
Mr. T.H. Cribb	63 Gap Creek Road, Brookfield.
Mr. L.G. McDonald	45 Yalumba Street, Carseldine.
Mr. G. Paris	28 Henderson Road, Deagon.
Mr. A. Gildea	33 Sunningdale Avenue, Rochedale.
Miss S. Williams	15 Mumbil Street, Stafford.

For country membership -

Mr. J.T. Brooks 153 Greenslopes Street, Edge Hill, Cairns.

In accordance with Society rules their election will be held over until the next meeting of the Society.

Election: The following nominations were received at the March Annual General Meeting and circulated in News Bulletin Vol. 8 No. 1:-

Mr. R. Raven, Miss L. Moxon, Dr. P.L. Boreham for ordinary membership, and Mr. Ken Walker for associate membership. They were elected to the Society by show of hands.

Main Business: An illustrated talk by Dr. Peter Boreham.

Dr. P.L. Boreham has had an extremely interesting career, having started out in Pharmacy and subsequently taking his Ph.D. in Pharmacology with the Nuffield Institute of Comparative Medicine in 1967. He was then lecturer in Immunology at Imperial College London, from 1968 until taking up his new position as Senior Pathologist with Q.I.M.R., Brisbane.

Whilst working with Imperial College his interest was environmental changes affecting feeding patterns of arthropods in relation to disease transmission. This work led to his travelling widely in East Africa - Kenya, Uganda, Tanzania and West Africa - Gambia, Nigeria. These travels are the subject of tonight's talk.

With Q.I.M.R. he is investigating drug reactions in filariasis.

MEDICAL ENTOMOLOGICAL SAFARIS

by Peter Boreham

Preparation for the Journey

Vector-borne diseases cause a vast amount of morbidity and mortality throughout the tropics. Malaria, onchocerciasis, trypanosomiasis, filariasis and arboviruses infect millions of people, resulting in the neglect of vast tracts of land in Africa, with consequent economic ruin for many communities. Scientists since the time of Macdonald (1) have attempted to produce mathematical models of mosquito-borne disease epidemiology involving the measurement of both entomological and parasitological parameters. The widely used formula for vectorial capacity produced by Macdonald is -

$$\frac{ma^2 p^n}{-\log_e p}$$

where m = mosquito density relative to man
a = man-biting habit
p = probability of a mosquito surviving through one day

$\frac{1}{-\log_e p}$ = expectation of life
n = length of extrinsic cycle of parasite

Much of our research has been concerned with the measurement of the man-biting habit which is the product of the frequency of feeding and the human blood index. It is generally assumed for the purposes of this calculation that -

1. All persons are equally attractive to mosquitoes thus ignoring factors like host size and behavioural and social differences.
2. Mosquitoes feed only once per gonotrophic cycle ignoring the possibility of interruptions in feeding.

The Journey Starts

Our safari begins on the plains of Thermopylae, Greece, in 1970, when attempts were made to measure the incidence of double meals in a natural population of Anopheles sacharovi. Engorged mosquitoes were collected from two cattle sheds and a house and subjected to exhaustive serological analyses to identify the source of the bloodmeal (2). Mixed feeds on serologically distinct hosts represented 6.3 and 12.5% of meals collected in the cattle sheds and 8.8% of feeds from the house. The problem with this type of approach is that a cryptic portion of double feeds is not measured i.e. interrupted feeds completed on the same or a closely related host species. Calculations from these results suggested that the biting habit was about 13% greater than expected for each gonotrophic cycle. Similar studies in Ethiopia with members of the An. gambiae complex demonstrated that mixed meals were greatest in biotopes containing different host species kept in close proximity.

Mountains ahead - New Equipment needed

In order to take this study any further and identify an interrupted meal completed on the same host species new techniques had to be developed. The answer came from forensic medicine where new methods of identifying dried blood stains are being used. Haptoglobins (Hp) are plasma proteins that occur in humans as three main polymorphic variants, distinguishable on gradient gel electrophoresis. Hp can be detected in a mosquito bloodmeal for about 24 hr after feeding and proved to be extremely good markers (3). The potential usefulness of the test was evaluated at Kismu, Kenya, by releasing unfed mosquitoes into an experimental hut in which two volunteers of different Hp type were sleeping. The following morning the mosquitoes were recaptured and when the blood was analysed it revealed that 8% had fed on both volunteers. The test was working and hopes were high to use it for assessing factors like size, sex and behavioural differences of individuals as well as obtaining accurate information on the natural incidence of double meals. The only previous attempts at natural 'choice' experiments, not involving an observer who can influence the result, have utilised differences in the cellular constituents of blood or the presence of a parasite in one of the pair. Such studies are only reliable while the cellular components remain intact in the mosquito gut.

Distractions and Deviations from the Route

Like any good detective story this research was plagued with false leads, blind alleys, subplots and irrelevencies, some of which proved more interesting than the original study. For example at Kismu an extensive study into the effect of different sampling methods on the apparent feeding patterns of mosquitoes showed that major differences were seen between those collected outdoors and those collected inside (4). Seasonal changes in feeding patterns of mosquitoes in a heronry at Kismu were correlated with Ciconiiform bird populations (5). Safaris were made to Upper Volta to look at the Simulium control projects, to Nigeria to evaluate a test kit for bloodmeal identification of arthropods, and to Tanzania to study the epidemiology of sleeping sickness in the Serengeti National Park.

The Serengeti project concentrated on the role of hyaenas as reservoirs of the human parasite and the possibility that other methods of transmission besides tsetse transmission may occur. Earlier work had shown that Glossina swynnertoni rarely feeds on hyaenas although they are commonly infected with trypanosomes. Six weeks of crawling into culverts (after removing warthogs, hyaenas, porcupines etc) and sifting through large amounts of soil in the bottom of these culverts revealed that the only other potential arthropod vector was the blood sucking larvae of the genus Auchmeromyia (Diptera: Calliphoridae). Two species were found, A. luteola (Fabricius), the Congo floor maggot, previously reported to be found almost entirely in association with man, and A. bequaerti Roubaud - a new record for this species. Reluctantly it was concluded that Auchmeromyia was not important in transmission since less than 1% of their meals were taken from hyaenas, the majority being from warthogs. No trypanosomes were isolated from Auchmeromyia and we were unable to transmit the parasite experimentally either cyclically or mechanically by the larvae (6). We are still uncertain of the reason for the high incidence of infections in the hyaena population but I suspect that they pick up the parasite through eating infected game. Another safari is certainly warranted to sort this out.

The Journey Continues

The major thrust of our work moved to West Africa, to Nigeria and The Gambia and gained impetus with the appointment of a postdoctoral entomologist Gordon Port. The Nigerian study proved to be a classic Agatha Christie mystery into the case of the missing haptoglobins (7) and a subsequent year's study trying to recover them (8). Fascinating stuff involving genetics, parasitology and haematology but regrettably no entomology. A three year project in The Gambia is now nearly completed which was designed to look at the effect of size on 'choice' by mosquitoes, movement of partially fed mosquitoes and the role of mosquito nets in malaria transmission.

In order to determine the effect of size 35 groups of people, usually a mother and child who normally sleep together and had different blood markers, were selected from two villages in The Gambia. The normal pattern is for the mother and child to sleep on the same bed under a net. These nets were often in a state of disrepair and acted as effective mosquito traps. Any blood fed mosquito could be collected in the morning and you can be reasonably sure that one of the occupants of the bed had provided the meal during the previous night. This procedure ensured that the natural life of the village was not interfered with in any way. The results showed that the proportion of feeds upon an individual by *An gambiae* in a group can be correlated with the proportion of the total surface area or weight of the group contributed by that individual (9).

Evidence that movement of bloodfed mosquitoes is important is accumulating. Several methods have been used, mark-recapture, looking for donkey or cattle fed mosquitoes inside houses when the hosts are tethered at known distances from the hut, and by looking for Hp types in bloodmeals different from the occupants of nets or huts.

Time for Reflection

Evidence is now available that the calculated value of 'a' in Macdonald's model is not as simple as first thought. Interrupted feeding does occur, the frequency of this varies between mosquito species, and is dependant upon a number of host behavioural differences as well as the proximity of hosts. Not all people are equally attractive to mosquitoes and size of the individual is one important factor in determining the number of bites received. Finally evidence is slowly accumulating to show that there is considerable movement of bloodfed *An gambiae* into huts, between huts and between nets. Thus we can echo the words of Pliny "Ex Africa semper aliquid novi" and as far as undertaking medical entomological safaris is concerned - a jolly good thing too.

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5. Chandler, J.A., Parsons, J., Boreham, P.F.L. & Gill, G.S. (1977). J. Med. Ent., 14, 233.
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8. Boreham, P.F.L., Lenahan, J.K., Port, G.R. & McGregor, I.A. (1980). Trans. R. Soc. trop. Med. Hyg. 74 (in press).
9. Port, G.R., Boreham, P.F.L. & Bryan, J.H. (1980). Bull ent. Res., 70, 133.

Discussion

Eric Reye: There appears to be two other factors which enter the matter of biting.

1. Intrinsic attractiveness which varies among members of a group e.g. 4 out of 40 may be found very attractive to mosquitoes - at a latter date it is still four not necessarily the same four.

2. The effect due to persons bitten from infancy who regard mosquito saliva as 'self' are not irritated and therefore take no action to evade bites - this seems to be quite important in filaria transmission in Polynesia.

Peter Boreham: Many factors such as odour, CO₂, moisture and warmth alter the attractiveness of individuals to mosquitoes. The relative importance of these factors with regard to the spacing of the hosts is unknown. All these factors are variable and may be unstable. Defensive behaviour of the host certainly can play a very significant role in determining the number of bites an individual may receive. One aspect of this is the immunity developed to the bite which very often allows a greater tolerance by indigenous people to mosquito bites than the non-indigenous population.

Vote of Thanks: Brian Kay moved the vote of thanks drawing attention to the range and depth of field of subjects Dr. Boreham has covered in his work. The topic is one of great importance and after tonight one realises that things were often not as simplistic as once thought.

The vote was carried by acclamation.

The Junior Vice-President closed the meeting and invited all to supper.



A REQUEST FOR A CORRESPONDENT

The society has received a letter from Goran Petersson in Sweden, written in broken English, requesting a contact in Australia. Goran is interested in Lepidoptera and would like to exchange insects, Scandinavian for Australian - he also has some African species to exchange.

Any Lepidopterists intending replying to this request are reminded to keep their English simple and preferably typed - unless you can reply in Swedish.

Goran's address:-

G. Petersson
Ståthöga Vånga
S - 617 00 SKARBLACKA
SWEDEN

Calendar of Entomological Society of Queensland Events

- May 12 General Meeting Room 303 Hartley Teakle Building, University of Queensland.
Spider Taxonomy - an Historical account by Dr. V.E. Davies.
- June 9 Notes and Exhibits meeting.
Members intending to present news at this meeting must notify the Secretary.
Please keep your talk brief, around 15 minutes, so that we can include greater numbers and diversity. You are also reminded that a typed version of your text is needed by June 13 for publication in the July Bulletin.
- July 14 General Meeting - no speaker as yet.

ABOUT PEOPLE

Congratulations are in order for Ian Galloway of D.P.I., who this month was awarded a Ph.D. by the University of Queensland. Ian is celebrating by using his long service leave to indulge in a trip to Japan and thence to Europe via the Trans-Siberian Railway. We don't expect to see him again until August.

While in London Ian intends spending some time at the British Museum of Natural History, where he will renew his acquaintance with Dr Z. Boucek, who was in Brisbane from December 1976 - February 1977 and also Dr E. Exley who is over there on Sabbatical leave.

Ian Naumann (CSIRO, Canberra) called in at D.P.I. and Queensland Museum on his return trip from Kakadu National Park, in the Alligator River region of Northern Territory. Ian has been looking at the problem caused by various wasps building their nests on Aboriginal art included in the new National Park. Whilst in the Northern Territory he was accompanied by Dr Malipatil of the N.T. Museum.

Dr. Shelly Barker of the Department of Zoology University of Adelaide, visited Brisbane for a week to study the Jewel Beetles of the genus Stigmodera. He looked at the collections of the D.P.I., Queensland Museum, Forestry and University of Queensland as well as the private collections of Richard Zietek and Jean Harslett in Stanthorpe before flying south to Canberra and more Buprestidae.

Tom Passlow D.P.I. is visiting the Torres Strait Is. to review present procedure involved in surveillance for exotic insects in the area. On the return trip he will break his journey for a "flying visit" to the northern D.P.I. station of Mareeba.

Geoff Monteith (Q.M.) will be accompanying Jeanette Covacevich and Glen Ingram who are presenting the Queensland Museum exhibit to the Second World Wilderness Conference in Cairns this June. From Cairns Geoff will later travel north to Cape York with three of the museum preparators, including Rudi Kohout, to make a casting of a Giant Termite Mound. This casting and a similar Meat ant casting, will form part of the Museum's public display when their new building is completed.

Dick Drew D.P.I. is on his way to the A.G.M. of the Australian Entomological Society at Lyndoch in South Australia. Dick is presenting a paper on the Northern Territory Fruit Fly "Dacus dorsalis". Whilst in S.A. Dick intends visiting the Waite Institute and the S.A. Museum.

UNFINANCIAL MEMBERS

Those members who have forgotten to pay their 1980 subscriptions are reminded that they have until the end of June before the fee goes up to \$10.00

If you have a red spot on the Bulletin our records show that you have not yet paid your fees.

THE AUSTRALIAN NATURAL HISTORY MEDALLION TRUST FUND

The council of the Entomological Society of Queensland has been contacted by the Field Naturalist Club of Victoria, seeking financial support for the running of their Medallion Award.

The council of the Queensland Entomological Society is unable to make any donation to the trust fund. However, in case some of our members feel that they would like to make a personal donation, here are a few facts about the medallion and its award.

The Field Naturalists Club of Victoria donates the medallion each year, and assumes administrative responsibility. The medallion is awarded to an individual annually in recognition of services to Australian Natural History. The Committee responsible for judging the award entries is made up of individuals drawn from a range of organisations with an active interest in natural history.

Any person is eligible for consideration who, in the past ten years has increased popular or scientific knowledge of Australian flora and/or fauna, including Man, or has assisted notably in the protection or propagation of Australian flora and/or fauna.

The Entomological Society of Queensland has for the past several years nominated Ian Mackerrass for this award. Recipients of this award since 1970 were;

Jean Galbraith (Vic.)
A.C. Beauglehole (Vic.)
Allen A. Strom (N.S.W.)
Edmund D. Gill (Vic.)
Vincent N. Serventy (W.A.)

Alison M. Ashby (S.A.)
Winifred M. Curtis (Tas.)
John R. Wheeler (Vic.)
Alan Sefton (N.S.W.)
Helen I. Aston (Vic.)

The Field Naturalists Club like many others, finds itself financially stressed and seeks donations. If you can offer support, cheques should be made payable to "F.N.C.V. Medallion Trust" and addressed to:-

Natural History Medallion General Committee
C/- National Herbarium
Birdwood Avenue
South Yarra
VICTORIA 3141

NATIONAL PARKS ASSOCIATION OF QUEENSLAND SEMINAR

"We Need National Parks"

Camp Stacey, Cunninghams Gap, Queensland May 23-25 1980
Friday 6.30 p.m. - Sunday 3.30 p.m.

All meals provided and accommodation in cabins "bunk house style"
Cost \$18.00 per person

More details and Registration Forms from
N.P.A.Q. Box 1752
G.P.O. Brisbane Queensland 4001

Closing date for Registration May 6th

BULLETIN ARTICLES

Although contributions to the News Bulletin are welcome at any time, the Publications Committee would prefer to receive them no later than the second week of the month.

It is imperative that this deadline be observed if publication in the current issue is desired.

When typed articles are sent in as contributions to the Bulletin, it would save the Committee a great deal of work and time and thereby speed publication if they could be set out as follows:

On A4 paper (International Quarto), single spaced with double spacing between paragraphs, a left-hand margin of 1 cm and a right-hand margin of 5 mm.

Having articles typed in this fashion makes the Editor's task of organizing the layout for the Bulletin much easier and would be greatly appreciated. However, if it is not possible to fulfil these requirements, please do not let this prevent you from forwarding contributions.

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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 May 12 1980 in Room 323 of the Hartley Teakle Building, University of Queensland, St. Lucia, Brisbane.

The main business of the evening will be an address by Dr. Valerie Davies, Curator of Arachnids at the Queensland Museum, entitled:

Spider Taxonomy - an historical account

Dr. Davies gained her B.Sc. in Dunedin, New Zealand where she also completed a Master's Thesis. She completed her Doctorate at Oxford with a study of the local Opiliones. Dr. Davies has examined most of the type specimens of the Australian spiders, necessitating expeditions to European Museums.

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.